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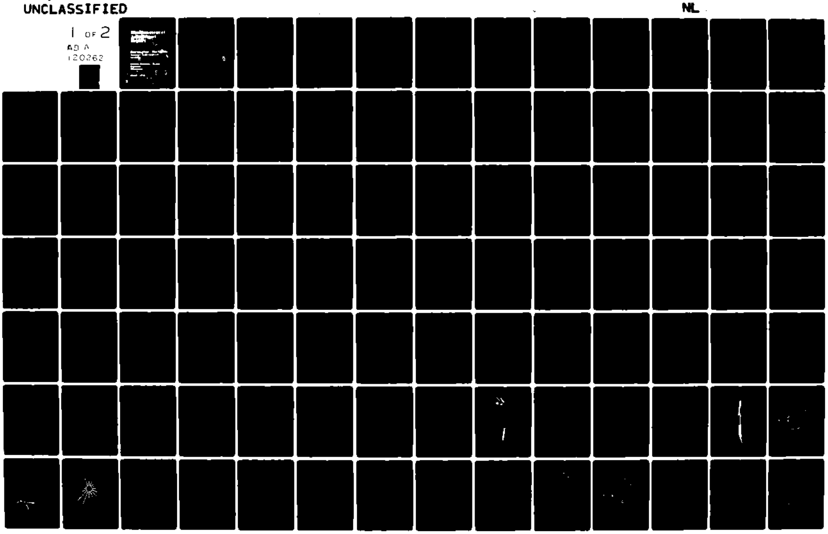

Environmental Assessment Report

Burlington Northern Taconite Transshipment Facility

Duluth-Superior Harbor Superior, Wisconsin

March 1975

REPORT DOCUMENTATION PAGE

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Burlington Northern, Inc., proposes expansion of its existing taconite unloading and transshipment facilities in the Allouez district of Superior, Wisconsin. Included in the expansion are complete inclosure of both existing and proposed conveyors through residential Allouez; inclosures of all conveyor transfer stations; building a new 100-acre stockpiling area, a new loop unloading track, a new car-unloading facility, an additional conveyor system, a shiploading facility on an existing dock; and modification of equipment for

pollution abatement.

ENVIRONMENTAL ASSESSMENT REPORT
BURLINGTON NORTHERN
TACONITE TRANSSHIPMENT FACILITY
DULUTH-SUPERIOR HARBOR
SUPERIOR, WISCONSIN

DEPARTMENT OF THE ARMY
1135 U.S. Post Office and Custom House
St. Paul, Minnesota 55101
March 1975

ENVIRONMENTAL ASSESSMENT REPORT
BURLINGTON NORTHERN
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INTRODUCTION

Burlington Northern, Inc., proposes expansion of its existing taconite unloading and transshipment facilities in the Allouez district of Superior, Wisconsin. Included in the expansion of the taconite transshipment facilities are modifications and improvements to existing equipment and operations. These improvements include: complete inclosure of both existing and proposed conveyors through residential Allouez; inclosures of all conveyor transfer stations; expansion and improvement of an existing dock and harbor and modification of equipment at the existing facility for pollution abatement. Also included would be additional landscape treatment in the same areas and improved housekeeping at both facilities.

1.000 PROJECT DESCRIPTION

1.100 Project Location. The proposed expansion would be located immediately adjacent to the existing facility in the western Lake Superior port of Duluth-Superior (Exhibit 1, page A1). The proposed site for the new dock would be on the bayward end of the existing C. Reiss Coal Dock located to the east of the present Burlington Northern ore docks. The stockpile expansion would be immediately southwest of the existing stockpiling area. The general locality is bounded by the Nemadji River on the northwest and by Bluff Creek to the southeast. Neither the stockpiles nor the construction site will affect the banks of the two streams.

1.200 Project Purposes. A number of taconite producers including Butler Taconite, The National Steel Company, and Bethlehem Steel Company have indicated that they will increase taconite production on the Mesabi Iron Range near Hibbing, Minnesota. In order to accommodate the increased rail and ship traffic generated by this increased production, Burlington Northern proposes an expansion and modification of its existing taconite transshipment facility in Superior, Wisconsin.

1.300 Existing Project. The existing transshipment facility handles a throughput of five million long tons (5 mlt) annually. The ore is delivered by unit train to a car dumping facility where it is unloaded at the rate of 3,000 long tons per hour.

1.301 Currently an average of one train per day passes through the facility. Trains are comprised of 200 bottom dump hopper cars, each having a capacity of 70 long tons. The cars are unloaded, automatically two at a time, in an unloading shed.

1.302 From the unloading shed, the ore travels by conveyor belt, either to the ship loading facility or to the ground storage area.

1.303 During the non-navigational season, (approximately January through March) the conveyor belt delivers taconite directly to the stockpile via a track-mounted stacker system. At the commencement of navigation, the taconite in the stockpile is reclaimed by means of a crawler-mounted bucket-wheel reclaimer at the rate of 3,000 long tons per hour and deposited on the conveyor system which runs to the shiploading facilities.

1.304 The existing conveyor system is a series of belts approximately 5000 ft. in total length. Each change of direction requires a "transfer point" where the taconite pellets are transferred from one belt to another. Exhibit 2 shows these "transfer points" for both the existing and proposed facilities.

1.305 Since the delivery of taconite to the facility is conducted on a year-round basis, substantial stockpiling takes place during the non-navigational season. At the existing taconite facility, approximately 1,600,000 long tons are stockpiled annually. This stockpile would be reduced to approximately 800,000 long tons if the new facility is constructed. With the possibility of year-round navigation on Lake Superior, the stockpile could be reduced substantially and might even be unnecessary.

1.306 A portable conveyor will be used in conjunction with the stacker boom to stockpile and reclaim the storage piles beyond the reach of the stacker boom.

1.307 On the existing facility, the shiploading operation consists of a pocket dock, whose pockets are so positioned that taconite can be loaded directly into the holds on the lake vessels by means of chutes.

1.400 Proposed Project. Expansion of the total operation to handle the projected 17.5 mlt in 1976 and 22.9 mlt in 1980 would be accomplished by building a new 100-acre stockpiling area, a new loop unloading track, a new car-unloading facility, an additional conveyor system, and a shiploading facility on an existing dock. (See Exhibit 2).

1.401 Taconite handled by the expanded system would originate at pelletizing plants operated by The Hanna Mining Company and Pickands Mather and Company in the Mesabi Iron Range. The ore would be railhauled to the Allouez transshipment facility along the route shown in Exhibit 3. After transshipment, transportation of ore from the terminal to the Lower Great Lakes ports would be in vessels of approximately 21,000-ton capacity. Use of vessels with 58,000-ton capacity is planned to begin by 1978. Primary consumers of the taconite handled through the facility would be Inland Steel Company, Wheeling-Pittsburgh Steel Company, National Steel Company, and Bethlehem Steel Company at their steel mills in the Lower Great Lakes Region. (See Exhibit 4.)

1.402 At the new facility, two stockpiles are proposed, one 25 feet high, 4,700 feet long and 365 feet wide at the base and one 25 feet high, 4,700 feet long and 220 feet wide at the base, when throughput is 12.5 mlt. At 17.9 mlt throughput, the stockpile widths would be increased to 400 feet. Initially, both stockpiles would hold approximately 3.5 mlt with maximum capacity of approximately 5 mlt when the facility handles 17.9 mlt throughput. Thus, the final tonnage available as stockpile would be about 5.8 million long tons for the existing and proposed facility. The site of the 100-acre stockpile expansion is immediately southwest of the existing stockpiles, which cover 39 acres.

1.403 Improvement of the C. Reiss Coal Dock includes the dredging of approximately 150,000 cubic yards of material from the existing slip. The permit application by Burlington Northern designated a diked containment area across the foot of the existing Burlington Northern and C. Reiss Coal Docks for the disposal of the dredged material. (Exhibits 2 and 5). This is the preferred dredge material disposal area, and would be the least costly as compared to the alternative methods.

1.500 Ship Loading Facility. The new shiploading system would consist of 36 storage bins and shuttle conveyors. The capacity of each storage bin would be 2,000 long tons; each shuttle conveyor would deliver approximately 182 long tons per hour. Thus, the total delivery capacity of the shuttle conveyor system would be 13,000 long tons per hour.

1.501 Although designed for loading a wide range of ships, the loading system for the new facility is specifically designed for vessels of the maximum size permitted through the Sault Ste. Marie Locks. Vessels in this class, such as the Roger Blough and the Stewart J. Cort, are capable of transporting 50,000 to 60,000 net long tons of ore.

1.600 Permits and Approvals. To obtain approval to construct and operate the proposed taconite terminal, Burlington Northern must apply for, submit, and receive review of permits from federal, state, and local agencies.

1.601 At the federal level, a U.S. Army Corps of Engineers application for a permit to construct in navigable waters is required. Dock construction and modification taking place in the waterway below the normal high water mark fall under regulations stated in Section 10 of the River and Harbors Act of 1899. Outfalls, settling pond discharges, and similar water pollution control activities are regulated by the provisions of Section 404 of the Federal Water Pollution Control Act Amendments of 1972.

1.602 Five state-level permits are required, all would be issued by the State of Wisconsin. The Wisconsin Department of Natural Resources (WDNR) reviews dredging and waterway-related structures under the requirements of Section 30.20 and 3012, respectively, of the Wisconsin Natural Resources Statutes. The air emission from the proposed terminal will fall under the regulation of Sections 144.39, and 154 of the Statutes. Water discharges will be permitted as part of the Wisconsin Pollutant Discharge Elimination System (WPDES) as provided by Section 200 of the Natural Resources Statutes. The final state permit, to be issued by the Department of Industry Labor and Human Relations, follows review of building plans and heating, ventilating, and air conditioning plans. Authority for this permit is given in Sections 50.10 and 59.20 of the State Statutes for Industry, Labor and Human Relations.

1.603 At the local level, building permits are required for all "buildings". Issuance is based upon the State's approval of the plans. The city of Superior's Building Inspection Department would be the issuing authority.

2.000 ENVIRONMENTAL SETTING WITHOUT PROPOSED PROJECT

2.100 Physical Environment. The city of Superior, Wisconsin, lies at the western end of Lake Superior in Douglas County. The project area within Superior is located in the Allouez Bay area of the Duluth-Superior Harbor between the Nemadji River and Bluff Creek. (See Exhibit 1).

2.110 Topography. The city is built on an extensive lowland plain floored by unconsolidated sediments and rimmed by highlands consisting of middle and late Precambrian sedimentary, metamorphic, and igneous rocks. The elevation of Lake Superior is controlled at within a foot of 602 feet above mean sea level. The plain rises to about 650 feet in downtown Superior, and the highlands to the north and south rise steeply to elevations of 1,200 to 1,400 feet. The lake plain has been incised as much as 50 feet in the immediate Superior area by northeastward flowing streams, principally the St. Louis River and the Nemadji River. These two drainage ways border the city on the northwest and southeast respectively.

2.120 Geology. The plain on which Superior is built consists of young (Pleistocene and Recent) sediments deposited in a deep trough incised in ancient (Precambrian) bedrock. A schematic (highly generalized) geologic northwest-southeast cross-section of the Superior Region is shown in Exhibit 6. The figure shows that the bedrock trough is directly underlain by red sandstone, the irregular eroded surface of which slopes northwestward beneath St. Louis Bay. The approximate elevation of the bedrock surface beneath Superior is shown in Exhibit 7.

2.121 The sandstone is overlain by a glacial drift left by the last Wisconsin ice advance through the region. The drift is dense and generally poorly sorted ice-deposited material which frequently grades downward into well-sorted outwash sands and gravels at the base. The draft ranges from 15 to 50 feet thick in most of the Superior region, to as many as 200 feet beneath St. Louis Bay.

2.122 Below the western part of the Superior area the lower part of the drift generally consists of relatively clean coarse sand and gravel deposited by glacial melt waters. This deposit is an important local source of ground water. Several domestic wells west and south of Superior and the village of Oliver (two miles southwest of Superior) draw their water from this horizon. Towards the east, the stratified drift becomes more silty and clayey and is not as important an aquifer.

2.123 An extensive red clay deposited during the subsequent high stage of Lake Superior appears to be laterally continuous throughout the region atop the glacial drift. These fine-grained lake sediments consist of the clay minerals illite and montmorillonite mixed with rock flour (rock debris finely pulverized by glacial abrasion) consisting of calcareous and other rock types. This lower clay horizon ranges to as much as 200 feet in thickness beneath northwest Superior along St. Louis Bay and 80 to 100 feet in thickness southeast of Superior at Allouez Bay. This red clay, sometimes gray, brown or blue, where rich in organics, probably dips gently below and is continuous beneath the entire Lake Superior basin.

2.124 Above the lower lake clays, a coarser post-glacial stream deposit extends throughout the Superior region from St. Louis Bay, where it approaches 200 feet in thickness, to the floodplain of the Nemadji River, where it lenses out. A sand isopach (thickness) map drawn from available well and boring data is shown in Exhibit 8. This sand was deposited by a northward-flowing generally sluggish stream system which developed as the lake level subsided. The sand is brownish or reddish-brown (eastward) and is generally loamy and fine textured. The sand is exposed south and west of Superior along the steeply incised banks of the St. Louis River and St. Louis Bay and its tributaries. Cross-bedding reported in these outcrops is inclined northward towards St. Louis Bay or the lake. The uppermost 10 to 30 feet of this sand is relatively clean and well sorted. This sand unit reportedly coarsens in updip (south-southwest), including coarse sand and golf-ball-size gravel at the village of Oliver. Most of the sand in the Superior harbor area is part of or has been transported from this sand deposit.

2.125 Above the shallow fluvial sand, the lake plain surface on which the city of Superior is constructed consists of more red or reddish-brown lake clay. This clay was deposited at an elevation as high as 700 feet, which is higher than the present lake level. The elevation of this clay deposit indicates the high water level of the lake which occurred thousands of years ago.

2.126 In the Superior region the lakeplain surface resembles a turtle back, the spine of which trends north along Route 35 and slope northward at 15 to 40 feet per mile (steepest nearer the harbor). The flanks of the "turtle back" slope more gently eastward and westward from the central ridge. This lakeplain surface has been smoothed by wave action westward to the approximate position of Grassy Point in St. Louis Bay. West and south of Grassy Point the lakeplain has been incised 40 to 50 feet by stream erosion. This stream erosion has completely removed the upper clay along the western and northern shorelines of Superior.

2.130 Climate. The weather in the Duluth-Superior region is subject to frequent changes in both the summer and winter seasons. Two important systems influence these changes. The passage of frontal systems associated with high and low pressure centers are major contributors to the climate. The second influence, and perhaps equally important, is Lake Superior, the largest and coolest of the Great Lakes. The influence of the lake is most noticeable during the spring and summer months of May, June and August, when cool easterly lake breezes dominate the wind picture. During the other months, when westerly and northwesterly winds are prevalent, the effect of the lake is somewhat reduced.

2.131 Climatological data for Duluth indicate moderate summers and cold winters characterize lands adjacent to western Lake Superior. The annual average temperature at Duluth is 37.9°F, with record extremes of 106°F and -41°F. Normally, temperatures in the 90's are recorded once each year and temperatures below 0°F on 53 days each year. Variations in temperature across the region reflect the lake effect, which can be quite substantial. On the plain near the lake, the growing season is 143 days, yet it is only 90 days on the plateau above Duluth.

2.132 Precipitation reaches a maximum in June, July, and August, with the least amount of precipitation falling during February, a pattern similar to that for most of Wisconsin. The average annual precipitation is 29 inches at Duluth. Again the lake effect and topography cause local variations. The plateau receives 79 inches of snow while the lake plain receives an average of 40 inches.

2.133 Relative humidity, an important factor in individual comfort, is generally high in Duluth-Superior. Fortunately, however, the highest humidities are normally accompanied by moderating lake winds, while the temperature extremes occur during periods of dry southwesterly and northwesterly winds. A wind rose for Duluth is presented in Exhibit 9. This wind rose reflects conditions at the Duluth airport which is located in the highlands above the lake and does not exactly coincide with conditions on the Superior plain.

2.140 Air Quality. The quality of the Duluth-Superior air shed has been studied recently as part of a state air quality monitoring program. The findings of the 1973 portion of the study confirmed previous Environmental Protection Agency (EPA) pollution designations pertaining to particulates levels which require immediate attention, and SO_x levels which require future attention (Exhibit 10.) Neither pollutant is, however, of such a serious concentration that it violates EPA health standards. For other prime air pollution parameters, CO, NO_x and hydrocarbons, the air shed was found to meet the current standards. Noxious odors are a frequently unconsidered pollution parameter, but they appear to be minimal within the air shed. The 1973 air pollution data indicated that the air quality problem at Duluth-Superior centers in the area near the St. Louis River. Three stations are operated in Superior as part of the State of Wisconsin's monitoring network. The Belknap Street location near the St. Louis Bay dock facilities records the highest particulate levels in Superior, followed by East 1st Street and then the station on the University of Wisconsin-Superior campus. The geometric mean at the Belknap location for the period January 1973-September 1973 exceeded 80 micrograms/cubic meter.

Table 2-1
Suspended Particulate Data

Belknap St. Sampling Site

Sampling Site	Sampling Intervals	No. of Samples	Geometric Mean	Standard Geometric Deviation	Minimum 24-Hour Concentration	Maximum 24-Hour Concentration
			mg/cu m		mg/cu m	mg/cu m
1706 Belknap	Jan 73-Mar 73	18	78.9	1.69	34.7	156.1
1706 Belknap	Apr 73-Jun 73	42	89.1	1.61	12.2	199.7
1706 Belknap	Jul 73-Sept 73	39	80.0	1.49	29.1	162.7
1706 Belknap	Jan 73-Sept 73	99	83.5	1.58	12.2	199.7

2.141 The latest air quality data available for Superior are high-volume particulates, trace metals, and sulfur dioxide data accrued from January through September, 1973 (Exhibit 10). Data on particulates and sulfur dioxide were collected by the Douglas County Health Department. Presently, personnel from the University of Wisconsin-Superior have assumed responsibility for collection of the samples. Because the taconite facility is not a significant source of sulfur dioxide, only particulate levels are relevant to the environmental setting.

2.142 The sampling site in Allouez is located approximately one block southwest of where the existing taconite conveyor crosses Itasca Street (Exhibit 11), and one block northeast of U.S. Highway 2, a major regional traffic route.

2.143 The air quality in the vicinity of the existing taconite operation is below the national primary standards with respect to particulates. The National Ambient Air Quality Standards adopted 30 April 1971 are applicable nationwide. These air quality standards for particulate matter are set forth in Table 2-2.

Table 2-2

National Ambient Air Quality Standards

	Primary Standard	Secondary Standard
Annual Geometric Mean	75 micrograms/m^3	60 micrograms/m^3
Maximum 24 hour average (not to be exceeded more than once per year.	260 micrograms/m^3	150 micrograms/m^3

2.144 The method of determination for particulate matter is the high-volume air sample. The primary ambient air standards were designed as public health standards; that is, the concentrations stipulated are those which were judged necessary, based on air quality criteria and an adequate margin of safety, to protect the public health. The secondary ambient air quality standards are concentrations of air quality necessary to protect the public welfare from known or anticipated adverse effects including aesthetic considerations and nuisance levels. The secondary standard will be used for comparison when judging the air quality control programs.

2.145 The January through September 1973 suspended particulate data is plotted on Exhibit 12. These data were reported in the air quality report January-September 1973 by the Department of Natural Resources, State of Wisconsin. The data from which the plots were made are shown in Table 2-3.

Table 2-3

Air Quality Summary for Superior, (Allouez) Wisconsin - 1973

Sampling Site	Sampling Intervals	No. of Samples	Geometric Mean	Standard Geometric Deviation	Minimum 24 hr. Concentration	Maximum 24 hr. Concentration
3718 E. 1st St.	Jan. 1973 March 1973	29	17.3	1.95	2.3	48.0
3718 E. 1st St.	April 1973 June 1973	41	50.3	1.76	15.0	151.2
3718 E. 1st St.	July 1973 Sept. 1973	38	58.1	1.84	16.2	192.3
3718 E. 1st St.	Jan. 1973	108	39.7	2.20	2.31	192.3

2.200 Hydrologic Environment

2.210 Surface Water. The St. Louis River is the largest tributary entering Lake Superior from the United States side. At Scanlon, Minnesota its mean recorded discharge over a 59-year period was 2,585 cubic feet per second. The stream has a drainage water source with 99 percent of its 3,442 square mile watershed basin in Minnesota. The river flows eastward into Lake Superior after descending from the Duluth escarpment near

Fond du Lac, Minnesota. From Fond du Lac to Lake Superior, the river is a meandering estuary with little current because its river valley was geologically "drowned" beneath the waters of Lake Superior. This has resulted in the formation of a good, natural commercial harbor at the outlet of the river. The lower 23 miles of the river serve as boundary waters between Minnesota and Wisconsin at Duluth-Superior. The gradient over this 23-mile course is 10 feet per mile. Numerous islands and embayments characterize this part of the river. The major bays along this lower section of the river are St. Louis Bay, Superior Bay, and Allouez Bay. The approximate acreage and shoreline mileage of each of these bays within the Wisconsin State Boundary are shown in the following table.

Table 2-4

St. Louis River - Wisconsin Portion
Shoreline Mileage and Bay Acreage

Bay	Acreage	Shoreline
St. Louis Bay	1,011.6	7.48 mi.
Superior Bay	1,301.3	4.85 mi.
Allouez Bay	1,330.2	8.30 mi.

2.211 The Nemadji River is a large drainage stream originating in Minnesota and flowing across northwest Douglas County. The Nemadji River drains a fairly large watershed (475 square miles) of which 215 square miles are in Douglas County. The length of the Nemadji River is 34.1 miles with a gradient of 2 feet per mile over its length. It empties into Superior Bay adjacent to the Burlington Northern Ore Docks in Superior. The Nemadji River watershed is a geologically young area, with soil erosion processes still occurring naturally at a rapid rate. The main river channel and tributaries are located down in deeply entrenched highly erodible areas and are subject to slippage along field gullies, roads, railroad cuts, and stream banks.

2.212 Stream sedimentation, which is a direct result of this severe erosion, is also a management problem. It is also causing navigation problems in the Duluth-Superior Harbor. The U.S. Army Corps of Engineers is continually dredging to keep channels deep enough for Great Lakes and ocean-going freighters. Twenty thousand cubic yards of material per year have been dredged to maintain the 27-foot channels in Allouez Bay required for freighters entering Burlington Northern Railroad's docks.

2.213 Two small creeks enter Allouez Bay to the east of the taconite facility. Bluff Creek, classified as an intermittent stream, is approximately 10 miles in length from its origin to its mouth. The average gradient is 26 feet per mile; it drains primarily forested areas. The Wisconsin Department of Natural Resources (1973) describes Bluff Creek as a small, intermittent drainage feeder into Allouez Bay of the St. Louis River. Wild forested lands account for 70 percent of the watershed land cover, willow - tag alder swamp wetlands account for 20 percent; the remaining 10 percent is cleared land. Unpredictable seasonal flows of water cause it to have low fish and wildlife value. Stream access is available at four public road crossings, and 6.6 miles of bank frontage are owned by Douglas County.

2.214 Bear Creek, the second small creek entering Allouez Bay, is approximately 7.5 miles long and has an average gradient of 9 feet per mile. The Wisconsin Department of Natural Resources (1973) describes the stream as fairly wide, sluggish, dark-stained drainage stream flowing north into the Amnicon River. About 1.5 miles downstream from its headwaters Bear Creek flows through Bear Lake, a medium-sized, dark-stained drainage lake. One mile downstream from Bear Lake, the channel is considerably wider (25-20 feet) than the rest of the stream. The remainder of the channel, approximately 6 miles, is generally narrow.

2.220 Ground Water. The extensive clays in the Superior region inhibit the vertical percolation of potential recharge water originating as precipitation or surface water runoff to the shallow sandy units. Thus, the water tends to move laterally through sand lenses interbedded in the clay to points of surface discharge. The upper sands near shore are generally dry in the approximate level of Lake Superior or its drainage ways. Inland, near the center of the lake plain, water levels may be 20-30 feet higher than lake level. Some of this water percolates vertically downward to the lower drift deposits and the sandstone bedrock. The red clays also act as confining units above the glacial drift and underlying sandstone formation. Water in the basal drift is derived partially by vertical leakage of fresh water through the overlying clay and to a lesser extent by deeply circulating water from the underlying bedrock. This water is discharged vertically upward under the lake or to pumping wells screened in the drift or sandstone.

2.230 Surface Water Quality. According to studies conducted by National Biocentrics, Inc. for a previous Corps of Engineers report (1973), and by Limnetics, Inc. for Roy F. Weston's report, the lower portion of the St. Louis River, including St. Louis Bay, is polluted (see Exhibit 13.) This is largely a result of extremely heavy concentration of people, private industry, and Great Lakes shipping. The river has on numerous occasions suffered oxygen depletions, resulting in heavy fish kills. Inadequately treated municipal sewage effluents and industrial wastes discharged into the river have been identified as the chief source of this problem. This condition is further aggravated by the operation of hydroelectric plants on the river which cause fluctuations in flow.

2.231 Water chemistry analyses conducted on the waters of St. Louis Bay have indicated that the river is a major source of the following chemical constituents to the harbor ecosystem.

Organic Nitrogen	Ammonia Nitrogen (NH_3-N)
Chloride (CI)	Total Organic Carbon (TOC)
Zinc (Zn)	Mercury (Hg)
Selenium (Se)	Iron (Fe)
Manganese (Mn)	

2.232 The Nemadji River is classified by the Wisconsin DNR as being for the propagation of fish and aquatic life. Although it receives no major point sources of pollution upstream from Burlington Northern's Allouez taconite facility and railyard, application of the standards for this classification to the Nemadji River shows that the water quality of this river is poor. The Nemadji is tainted with grease and oil, and it contains high iron concentrations. During periods of high surface runoff the River runs red with clay, yielding high suspended solids concentrations occasionally in excess of 1000 mg/1. Corresponding to this are relatively high fecal coliform counts and very high iron concentrations (37 mg/1.)

2.233 Bluff Creek is an intermittent stream also classified as being for the propagation of fish and aquatic life. Although it too receives no point-source discharges upstream from the Burlington Northern Allouez railyard, the stream carries a high suspended solids load, because of surface run-off erosion of the clayey soil in the drainage basin, and has a high fecal coliform count. The suspended solids load is transported through Allouez Bay and into Lake Superior.

2.234 Burlington Northern presently has three point-source discharges at its taconite facility. Approximately 14,000 gallons per day (gpd) of sanitary waste, wash water, and storm drainage is collected, treated, and discharged into Bluff Creek. Eighty thousand gpd of backwash water and water treatment sludge is discharged directly to Allouez Bay once a week from the water treatment plant situated within Dock #2. Both of these discharges have received National Pollutant Elimination Discharge System (NPEDS) permits and are operating under effluent limits set by the Wisconsin DNR.

2.235 Water quality in the vicinity of the existing C. Reiss Coal Dock (to be modified for the proposed taconite terminal) is essentially as degraded as the remainder of Superior and Allouez Bay system. The water quality survey carried out in this area (see Exhibit 13) found that the waters introduced into Allouez and Superior Bays by the Nemadji River and Bluff Creek are significantly more degraded than the bay water. The highest levels of mercury, cadmium, and ammonia nitrogen in the Duluth-Superior Harbor are found at the general confluence of the Nemadji and the Bluff Rivers at Superior Bay.

2.236 Stockpile runoff and leachate is presently collected by an underground drainage system and discharged directly to the Nemadji River. This effluent may contribute to the high suspended solids and iron concentrations in the river. However, this source is intermittent and seasonal.

2.240 Ground Water Quality. The shallowest waters in the fluvial sands or drift beneath the lake plain are generally those which have had the least contact with the sediments and are theretore the least highly mineralized. Water in the upper sands and glacial drift ranges from 60 to 300 mg/l in dissolved solids and generally is in the 100 to 150 mg/l range. This water is typically a calcium-magnesium bicarbonate water, although some of the concentrated samples are predominantly sodium chloride and must be derived partly from the deeper regional flow system. The pH ranges from 7.6 to 8.4 because the calcareous rock flows are dissolved in the clay fraction of sediments.

2.241 The water obtained from Precambrian bedrock sandstone usually has 300 to 500 mg/l dissolved solids. However, dissolved solids can range from 100 to 1,600 mg/l. The dissolved constituents of derived water are typically predominantly calcium; magnesium; sodium bicarbonate and chloride in the lower dissolved solids range; sodium; calcium sulfate or chloride in the intermediate dissolved solids range, and sodium chloride when highly mineralized. The pH of these waters ranges from 6.9 to 9.1. Some of the waters have high iron concentrations and/or "sulfur" odors. The highly mineralized (500 mg/l and above) nature of much of the sandstone derived water makes it unsuitable for potable and even some industrial uses.

2.250 Water Use. The city of Superior presently obtains its entire municipal water supply from a series of wellpoints and infiltration galleries on Minnesota Point due east of Barker's Island. The pumpage rate from this system ranges from about 6 million gallons per day (mgd), during the peak summer demand period, to about 4.5 mgd during the winter. The offshore sand bars in which the wells are developed are about 50 feet thick. Water developed from these sands is induced by the pumpage from the lake into the shallow sand sediments. The water is similar in quality to that of the lake, being only slightly mineralized, and is cleared by filtration through the sandy sediments. A pipeline extending two miles offshore from Minnesota Point under the lake and opening directly to the lake water was constructed several years ago. This system can produce plentiful supplies of water, but turbidity in the lake water often renders its quality poor.

2.251 Ground-water use developed onshore in the Superior region has been very limited because the glacial sediments have generally poor yields and because the Precambrian sandstone bedrock is deeper and more highly mineralized.

2.252 Exhibit 14 shows the location of all known wells in the Superior area. Only a few wells produce water from the glacial drift. These include two small domestic wells at Billings Point and several wells owned by the Kopper's Chemical Company two miles south of the center of Superior. The maximum yield reported from the industrial wells is 30 gallons per minute. The deeper sandstone reportedly yields 50 to 100 gallons per minute to industrial-size wells, but use of the deeper water has been restricted because of mineralization problems and because of the availability of fresh municipal water derived from the offshore infiltration gallery and wellpoint system. Most of the domestic ground-water pumpage is from the sandstone aquifer. Since ground-water use in the Superior region is so restricted, it appears that pumpage has probably not seriously disrupted the natural ground water flow pattern or ground-water quality.

2.300 Biological Environment

2.310 Terrestrial Flora. Since the retreat of the last glaciers, the project vicinity sustained boreal forest and northern marsh communities, including many species near the farthest reach of their ranges. Within the last two hundred years, human activities have initiated striking changes in the area's vegetative communities, most notably through lumbering. Consequential natural catastrophies (fire, disease) have also helped to diminish and virtually eliminate the virgin boreal forest from much of the area. With continued human development, landscape alteration has kept conifer species from maturing in mixed stands as they once did.

2.311 An unusual mixture of red and white pine, white and yellow birch, cedar, and tamarack grew on the red clays of northern Douglas County. These pineries have been consumed, changing the character of the vicinity's forests dramatically. Generally, tree species in low-lying areas have remained intact and most merchantable timber has come from uplands, the lakeshore, and from along railways. With the exception of Wisconsin and Minnesota Points, where pines may be up to 140 and 170 years old, respectively, most tree stands are relatively young (Bernard and Davidson, 1969). Today, second growths of aspen, birch and dogwood with only occasional pines dominate woody stands in the harbor area.

2.312 Since much of the area is composed of low-lying lake plain environments, dominant trees are those which are adaptable to such situations, including tamarack, cedar, and black spruce (Curtis, 1959). Other plants associated with wetter environments include cattails, ta alder, willow, sedges, rushes, and numerous herbs. Where woodlands have been cleared, or wetlands have been filled, field communities occur, dominated by grasses and weedy forbs, and later by dogwood, aspen and bigtooth aspen. Railroad yards, roadsides, and vacant lots in residential areas usually vegetated by "weedy" herbs may be considered as another vegetation type common to the project area.

2.313 Boreal forest stands include balsam fir, spruce, white cedar, red maple and a number of evergeen shrubs. Lycopodium, bunchberry, wintergreen, blueberry and twinflower are common ground plants. The boreal forest vestiges and dunes cover on the points will be discussed later in the specific descriptions of the project vicinity.

2.320 <u>Terrestrial Fauna</u>. Muskrat, otter, beaver and mink are among the animals trapped in or near Superior's wetlands. Perhaps the most notable and conspicuous mammal is the muskrat. These aquatically adapted mammals use cattails for building their "brush pile" homes, and eat sedges and rushes. They in turn provide ideal prey for mink, fox, bobcats, and birds of prey which regularly eat them as supplementary food. Also associated with this unique habitat are beaver, bog lemmings, cottontails, and snowshoe rabbits. Beaver and muskrat would be found here exclusively, although the other species mentioned would use this area on an annual basis and to various degrees.

2.321 A second habitat type is residential, on the basis of man's inhabitation and resultant manipulation of the environment. The vegetative assemblages are seldom natural in origin but usually consist of foreign species like Japanese yew, timothy grass, Kentucky blue grass, and river birch. These grasses, shrubs, and trees are usually pruned to a desired pattern and are normally incapable of competing with existing natural vegetation without the aid of selective herbicides and fertilizers. The animals and birds associated with this ecosystem are those which have adapted to and are compatible with human habitation. The larger mammals are domestic in nature with such feral species as the raccoon, opossum, and skunk, which frequently visit refuse.

2.322 The third major vegetation type can be found west and south of the existing taconite stockpiles as well as in the middle of the marsh area at the mouth of the Nemadji River. The dominant canopy vegetation is poplar-willow-alder association. The dominant understory vegetation is current and blue grass interspersed with occasional ragweed, brome grass and goldenrod. The mammals associated with this vegetation are cottontails, snowshoes, foxes, red squirrels, voles, and occasional white-tailed deer. These vegetation aggregations usually provide cover areas for the above species during daylight hours.

2.323 The area southeast of the existing taconite stockpile constitutes a fourth major wildlife habitat. The dominant overstory is characterized by white birch-balsam fir association. The dominant understory is once again currant and blue grass; however, ferns were abundant, indicating a high organic soil base. The mammals associated with this area are the mink, snowshoe, white-tailed deer (in winter), and an occasional bobcat or lynx.

2.324 The Norway rat, attracted to grain spilled around grain elevators and railroad tracks, probably has the most severe impact on the Superior economy and "quality of life." The rat's population is said to be reaching peak proportions, reflected by the number found in sewers residential and business areas, besides around the harbor. Efforts to eliminate the rat may have in the past affected other animals, through the use of patent secondary killing rodenticides, to which several species were in one way or another vulnerable. Wisconsin state laws now restrict the use of certain pesticides which are known to have secondary effects.

2.330 Birds. Of the 270-plus species of birds reported for Douglas County, many would be expected in the area of the project. Some of these birds are infrequent visitors or seasonal migrants; yet over 110 species of birds have been noted as nesting and breeding within the county. Many birds are near the limit of their range by the Superior shores, and several species considered endangered or of changing status in Wisconsin are reported for Douglas County. The tempering influence of the lake on weather extremes and the abundant grain supplies allow several more southern-oriented species to be sustained in Superior.

2.331 A distinctive feature of Superior bird life is the tremendous diversity of shore, marsh and water birds which reside or migrate through the Allouez and St. Louis Bay areas. Migrating waterfowl visit Allouez and St. Louis Bays each year in considerable numbers. In the autumn of 1973, at least 17 species of waterfowl visited Allouez Bay (Kossick, 1974). Mallard, wood duck, black duck, blue-wing teal, ring-necked duck, and common, hooded and red-breasted mergansers commonly visit and nest in Superior's bays. Coot, whistling swan, pied-billed and horned grebes, scaups, bufflehead and common goldeneye may also visit the bay waters. Geese may pass over the area, yet seldom stop in large numbers.

2.332 The migration of birds of prey through the Duluth-Superior vicinity is worthy of further note. For many migratory birds of prey, autumn is the most notable time of buildup into flocks which pass through the area. These predatory birds make heavier use of this route through the harbor than nearly anywhere else on the continent. The birds usually trail down the north shore of Lake Superior, then traverse Minnesota Point to St. Louis Bay, or to Wisconsin Point, heading south.

2.333 Although no formal plans have been articulated with local, county, or state governments, there has been a suggestion within the Wisconsin Department of Natural Resources that observation towers be set up on Wisconsin Point for use by naturalists and local residents interested in the hawk migration. Goshawks and rough-legged and broad-winged hawks are among the most notable migrants customarily flying the route. Snowy owls are the area's most conspicuous winter transients among birds of prey.

2.334 Upland game birds, geese, and ducks are hunted in Douglas County. Twenty species of birds are available to the hunter. There are a number of species of birds, now ubiquitous throughout the United States, which are adaptable to or advantaged by living in human settlements, structures and artificial landscapes. As part of nature in the city, these birds often nest or roost on buildings and bridges in Superior and Duluth. They may derive their food from garbage, ornamental plantings, or a variety of other sources common to developed areas. The breeding birds of Superior neighborhoods frequently settle around yards or parks, utilizing bird feeders, shrubs and shelters. The rock dove ("pigeon") population increased to such an extent that the city of Superior undertook an extensive poisoning campaign several years ago to eliminate the nuisance. The pigeon population control program succeeded in reducing their number.

2.340 <u>Aquatic Ecosystem</u>. The biotic community of the St. Louis Bay aquatic system includes benthos, phytoplankton, and fish. Each part of this association is interrelated by virtue of its interdependence.

This efficiency between the parts of the community will determine its stability, and ultimately its longevity. When natural or unnatural forces act upon this system, it has the effect of upsetting the equilibrium of the system; however, the system has a built-in ability to absorb these forces without drastically altering the community. Should continued alteration occur, the system could potentially collapse and be replaced by a more simple system.

2.341 Benthos (macroinvertebrates) are important members of the aquatic food web. The taxonomic groups which are most common in freshwater are insects, annelids, mollusks, flatworms, and crustaceans. Used with caution, the presence or absence of various members of these groups and the numbers of individual organisms are indicators as to the trophic state of the water body. In Allouez Bay, the primary species found and their population levels indicate a eutrophic and/or polluted aquatic ecosystem.

2.342 Various motile aquatic microflora (phytoplankton) and microfauna (zooplankton) species are also associated with the aquatic ecosystem of the Superior Bay. Commonly encountered local plankton types, algae, diatoms (flora); rotifers, protozoans, and dino-flagellate (fauna), are generally associated with degraded water quality.

2.343 The fishery found near the taconite docks would, in all likelihood, consist of all those species found in other areas of the harbor. Commonly encountered in Superior Harbor-Allouez Bay are yellow walleye and northern pike, yellow perch, black bullhead, white sucker, longnose sucker, and carp. Considered rare or uncommon are muskellunge, rainbow trout, brown trout, and brook trout.

2.350 Natural Areas. The terrestrial environments surrounding the twin ports are both unique and intriguing. Situated between the "mainland" and the lake are two sandbars, appropriately named Wisconsin and Minnesota Points. They are the longest freshwater bay-mouth bars in the world, and aid in protecting Duluth and Superior from wave action from Lake Superior. The protected shallows formed behind the sandbars have been subdivided into Allouez Bay (far east), Superior Bay, and St. Louis Bay. A natural refuge for numerous life-forms, the same environmental features form the basis of the human-oriented harbor-of-refuge (See Exhibit 15).

2.400 Socio-Economic Environment

2.410 Population. Douglas County in Wisconsin and St. Louis County in Minnesota make up the Standard Metropolitan Statistical Area (SMSA) for the combined cities of Superior and Duluth. The population of the SMSA, according to the 1970 census, was approximately 265,000, with the city of Superior's 32,237 residents accounting for 12.1 percent. Duluth, with 100,578 residents, accounted for 37.9 percent of the SMSA population.

2.411 Both cities and the SMSA have experienced declining populations despite the fact that both Minnesota and Wisconsin are growing at an annual rate of about 11.5 percent. In the period 1960 to 1970 both cities' populations fell 6 percent, while the SMSA as a whole lost 8 percent. This trend is projected to be reversed and replaced with a slow growth trend, approximately 3 percent, in the years between 1970 and 1985 (HOTL COG, 1970).

2.412 The Duluth-Superior SMSA has an area of approximately 7,397 square miles, which includes all the land area of Douglas County, Wisconsin, and St. Louis County, Minnesota. The population density of the central cities was approximately 1,280 persons per square mile in 1970.

2.413 Ethnically, the majority of the people of both cities have their family origins in the northern countries of Sweden, Germany, Canada, Poland and the United Kingdom. The racial statistics show 98.8 percent of Superior's and 98.3 percent of Duluth's inhabitants to be Caucasion. Statistics relating to the sex of the population show Superior to be composed of 49 percent males and 51 percent females, and Duluth to have a breakdown of 47 percent male and 53 percent female. The age distribution of the population of the Superior-Duluth SMSA, according to the 1970 census, showed 34.5 percent of the population under age 18, with 7.5 percent younger than five years. The elderly, over age 65, accounted for 13 percent of the regional inhabitants, and the main bulk of the population, 52.5 percent, are in the age bracket 18-64 years of age. The median age for the SMSA population was found to be 29.8 years.

2.414 Educationally, it is interesting to note that more than 58 percent of the inhabitants of Superior and Duluth over age 25 have finished high school. Of that percentage approximately four out of every ten have gone on to obtain one or more years of college education.

2.420 Transportation. In addition to the water transportation available at the Port of Duluth-Superior, there are other modes of transportation in the area. Interstate Highway 35 connects the Twin Ports to Minneapolis-St. Paul as well as to the Iron Range cities and other points in northeastern Minnesota. Improvements are being made on Highway 53, which will link Duluth-Superior to Eau Claire and Madison, Wisconsin, and to Chicago, Illinois. Duluth and Superior combined have more than 6,000 miles of streets and alleys.

2.421 The Blatnik "high bridge" and the existing Arrowhead Bridge, scheduled for replacement, cross the St. Louis River and link the Wisconsin city of Superior with the Minnesota city of Duluth.

2.422 Six railroads and one transfer railroad carry manufactured goods and commodities to and from the many harbor facilities. Several trucking firms also serve the community and the waterfront terminals.

2.423 The Duluth International Airport serves the area with regularly scheduled flights by North Central Airlines.

2.430 Industry. SMSA employment statistics show the relative importance of several major employment categories for 1970. Among the largest employers are: trade; non-agricultural industries; manufacturing; transportation; utilities; communications; and mineral extractions.

2.431 Industrial and commercial operations tend to be scattered throughout the Metropolitan Area. Major industries, particularly those involved with marine transportation, are primarily situated along the shores of St. Louis Bay, Superior Bay, and Allouez Bay. Small industries are located chiefly in the older core sections of the cities, with some recent expansion or movement to outlying industrial parks. The major industries in the area include those listed in Exhibit 16.

2.440 Economy. In 1958, the Federal Government declared the Duluth-Superior area to be economically depressed. The reason given was the "consistant and chronic unemployment," which was a direct result of the reduction in the iron ore shipping activity in the Port. This reduction in iron ore shipping resulted from a depletion in high-grade iron ore sources and increased competition from foreign sources.

2.441 With the iron ore industry as the major economic base, a reduction in productivity ultimately caused oscillations in the economy. When this industry began to have economic difficulties, it was dramatically evidenced in the economic profile of the area. To correct this situation and to prevent a recurrence of such an economic shock, there have been concentrated efforts made to diversify the economy and the employment base. By 1985 it is expected that there will be a 45 percent increase in the work force in the areas of banking, insurance, real estate, professional, governmental, educational, and medical services.

2.442 The loss of many jobs due to the closing of U.S. Steel's operations in 1972-73 was a major economic blow to the area. To prevent such an economic shock from recurring, attempts are being made to attract new business enterprises to diversify the economic community. In recent years, the government has become a major employer in the Twin Ports area. This came about partly to help ease the distressed economic condition of the area. The national trend has been for government to become labor intensive; consequently, government employment will probably continue to rise in the coming years (HOTL-COG, 1972).

2.443 The economic base of Duluth-Superior will change its emphasis from manufacturing and wholesale-retail trade to medical, educational, governmental and recreational services. It is anticipated that shipping activity in the port will continue to grow. If these things occur as projected, the population outmigration can be stemmed. Nevertheless, a disproportionate number of very young and aged compared to the economic producers of the middle-aged group will still cause the economic growth of the area to be stunted (HOTL-COG, 1972).

2.444 Unemployment rates are high. A brief look at yearly estimated averages for number of unemployed in Duluth and Superior over the last four years shows the annual average to be approximately 2,700 for Duluth and 1,300 for Superior. Generally speaking, the first four months of the year tend to have the highest unemployment rate for Superior. The unemployment rate for Superior has been approximately $1\frac{1}{2}$ to 2 times the rate of the State of Wisconsin for corresponding months of the last four years. In 1973 the average unemployment rate for the Superior Labor Market Area (Douglas County) was 8.7 percent, or nearly double that of Wisconsin as a whole. In combined St. Louis and Douglas Counties, nearly 4,000 people were out of work on the average during each month of 1973.

2.445 The unemployment rates show a general trend toward higher unemployment during the winter months. Contributing to this cyclic rise and fall in employment are the tourism and recreation industries and other seasonal occupations such as construction. The port facilities also create an influence by their seasonal operations. The closing of the port during the winter months when ice prohibits passage of ships through the harbor puts many workers among the ranks of the unemployed.

2.446 Relating the foregoing figures to seasons, it can be seen that the average number of unemployed for the area in 1973 dropped from 4,600 unemployed during the non-shipping season to 3,700 unemployed during the shipping season. Included in this average difference (approximately 900 unemployed individuals between the shipping and non-shipping seasons), certainly are those who are unemployed as a result of the closing of the port. The exact number of layoffs directly attributable to the closing of the port is unknown.

2.450 Labor. The labor force which serves the economic community of both cities numbers about 45,000 as of 1970, with men making up 60.6 percent and women 39.4 percent of the working population. Unemployment, a problem for both communities (6.5 percent annual average), is particularly severe in Superior, where seasonal peaks during the winter months can bring the rate up over 10 percent. The income levels for the two communities also varies significantly, with Superior's mean income of $7,083 being 11 percent less than that of Duluth. Occupationally, the largest percentage of the labor force is involved in secretarial and clerical work. This is closely followed by service workers, 16.4 percent, professionals and technicians, 15.8 percent; and craftsmen, foremen, and associated workers, with 13.4 percent of the labor force.

2.451 The major employment categories for 1970 include trade with 19,760; non-agriculture with 16,608, manufacturing with 12,939; services 9,986; transportation, utilities and communities with 9,229; and mineral extraction with 9,056.

2.460 Emergency Services. Emergency services in the Twin Ports area are good. Medical services of hospitals exceed the minimum required for the area. Hospital services are considered to be one of the basic industries because the medical facilities available serve the medical needs of a much larger area than just Douglas and St. Louis counties. It is considered to be an exportive industry for the area.

2.461 The American Insurance Association's (A.I.A.) rating of Superior, Wisconsin, based on a grading schedule which includes: water availability, the fire department, fire communications and fire safety controls -- is a fourth class rating. The rating scale, from first class (highest), to tenth class (lowest), is used to determine fire insurance rates. A fourth class rating for Superior is considered a good rating by the A.I.A.

2.462 The firefighting organization consisting of 68 men, serves the city from four fire stations. The approximately 45 square mile service area is served by a variety of equipment types, including pumpers, a 65-foot hydraulic ladder truck, an 85-foot snorkel truck, a tanker, a grass fire rig, and several other vehicles. A mutual assistance pact with other firefighting companies provides wide area service for the counties in the area.

2.463 The Police Department in Superior has 65 men working three shifts to patrol the 45 square miles of city with 14 squad cars. The Douglas County Sheriffs Department has authority in the county and patrols the areas outside the cities. The Sheriffs Department provides emergency ambulance service for the entire county with two completely equipped rescue trucks, and provides emergency service to neighboring counties when special needs arise. Approximately 25 volunteers man the two rescue trucks. Additional manpower is available when needed by a local Explorer Boy Scout Troop, with approximately 40 volunteers. Several scuba diver volunteers are available when those specialized services are required.

2.470 Government and Governmental Agencies. Douglas County, Wisconsin, has a 28-member Board of Supervisors. Twenty-six members are elected to two-year terms from each of the 26 districts in the county; two members are elected at large. The Board members select their own chairman. Other elected officials include County Clerk, County Treasurer, Clerk of Courts, Sheriff, District Attorney, Register of Deeds, County Coroner, County Supervisor, and County Judges. The County Board of Supervisors administers the budget, which for 1974 is $8.3 million. Of this, approximately 8.5 percent is used for welfare, which is also controlled by the Board of Supervisors.

2.471 Seven County Commissioners administer the 1974 budget of $57.4 million for St. Louis County. Their term of office is four years and they are elected from seven county districts, each with a population of approximately 32,000. A chairman is selected by the other board members. The welfare budget (approximately 61 percent of the county budget) is administered by the Welfare Board, which consists of two County Commissioners and three laymen appointed by the County Board.

2.472 The city of Superior has a Mayor-Alderman form of government, with 10 aldermen elected to two-year terms from 10 districts within the city. The Mayor has a 4-year term. Twelve departments, the Legal Department, City Clerk, Finance Department, Public Works Department, Parks and Recreation, Health Department, City Assessor, Building Inspector, City/County Planning and Development, Port Director, Police Department, and Fire Department, are operated under the 1974 city budget of $6.8 million.

2.473 Duluth, Minnesota, has a strong Mayor-Council type of government, with the Mayor and nine Council members elected to four-year terms. There are five councilmanic districts; the four remaining members are elected at large. City departments of Economic Development, Finance and Records, Fire and Police, Libraries, Parks and Recreation, Public Service, Research and Planning, and Water and Gas operate on an overall 1974 city budget of $28 million.

2.474 A number of agencies and organizations for local and regional planning operate in the Duluth-Superior area. Among them are the Planning Department of Head of the Lakes - Council of Governments (HOTL-COG), the Northwestern Wisconsin Regional Planning and Development Commission, the Arrowhead Regional Development Commission, the City of

Superior Planning Department, and the City of Duluth Department of Planning and Research. Planning and development for the port facilities is handled by the Seaway Port Authority of Duluth and by the Superior Port Authority.

2.480 Archaeologic, Historic, and Scientific Areas. The Superior area has several historical sites (See Exhibit 17). Among them are the whaleback ship Meteor, the Stockade, the Ore Docks, the Douglas County Historical Museum, and the ruin of the Minnesota Point Lighthouse. The Meteor, a cargo ship, was built in 1896. It remains as the oldest tanker of its kind in the world and a point of significant navigational interest. This historical ship has been dry-docked permanently on Barkers Island. During the summer months it serves as a maritime museum. The Minnesota Point Lighthouse was built in 1858 and was once the one of the finest on Lake Superior.

2.481 One area of potential scientific value exists near the taconite facility. Wisconsin Point has received attention because of its natural vegetation and unusual geology. Wisconsin Point which lies directly across Allouez Bay from the docks is one of the longest freshwater bay-mouth bars in the world. Furthermore, the vegetation on this sand bar shows many stages of classical ecological succession ranging from sand dune stages to mature coniferous-deciduous climax forest. Accordingly, the Scientific Areas Preservation Council of the State of Wisconsin has encouraged acquisition of the point by the Wisconsin Department of Natural Resources. The council feels the point is a potential scientific area of at least state significance. The State Historical Society of Wisconsin has deemed it necessary to conduct an archaeological survey to be done by a professional archaeologist to assess the impacts of the proposed project on archeological resources. Roy F. Weston, Inc. has assured the Corps of Engineers that a survey will be conducted.

3.000 RELATIONSHIP OF PROPOSED PROJECT TO FUTURE LAND USES

3.100 Existing Land Use. Land use patterns in Duluth-Superior have been greatly influenced by the harbor, by other transportation means, such as the railroad, by economics, and by topography. Heavy industrial uses are found along the waterfront throughout the harbor area. Residential neighborhoods fringe the industrial lands. Many of the residential neighborhoods are served by their own commercial modes. Open spaces and undeveloped lands are widely distributed and represent a substantial percentage of the urban area. Transportation corridors for rail and highway are particularly concentrated to serve the various waterfront terminals (See Exhibit 18).

3.101 Percentage distribution of lands in the two central cities show much of the urban acreage to be dedicated to public and quasi-public open space, streets and alleys, residential, and transportation terminal storage and communications. However, the greatest portion of urban land, approximately 50 percent, is vacant land (See Exhibit 19).

3.102 As in many metropolitan areas, a substantial percentage (18 percent) of the developed land in Superior and Duluth has gone for residential uses. The majority of residences in both cities are single-family detached units. The older neighborhoods which surround the core areas of the central cities are somewhat deteriorated. In Superior, the main problem area is in the North End, that portion of town which is immediately adjacent to the commercial-industrial railroad activities which take place along St. Louis Bay. For Duluth, the areas of concern are spread from the Central Hillside immediately adjacent to the urban core, to the West End and West Duluth areas, which abut marine terminals, railyards, and various industrial developments.

3.200 Land Uses and Aesthetic Qualities. St. Louis County, Minnesota, and Douglas County, Wisconsin, border one another at the western tip of Lake Superior where the St. Louis River separates Wisconsin from Minnesota. The bluffs of Duluth rise several hundred feet above the harbor and the plain of Superior. The counties are dotted by lakes and wetlands. The fresh clean smell of the north-woods forests and woodlands and the cool summers attract many vacationers each year.

3.201 Large portions of the counties are rural and undeveloped. The recreation industry in the area is important, with skiing and snowmobiling in the winter and camping and water-oriented activity in the cool summer months. In addition, many sightseers come to Duluth-Superior to see the harbor and the large ships and docks.

3.202 Land uses in Duluth and Superior run the gamut from heavy industry to residential. In the vicinity of the harbor, the range of land uses tends to be much narrower, with heavy industry and shipping-related uses prevailing. Other uses can also be found, however, such as the residential developments and public open space lands on Minnesota Point.

3.203 Numerous visual elements in the landscape of Duluth-Superior clearly define this area as a port city of major significance. The docks of the well-protected harbor area provide berth and unloading areas for the hundreds of domestic and foreign ships which pass through the port each year. Vast railyards about the harbor area serve as terminals for many hundreds of freight cars, which carry coal, ores and other raw materials as well as containerized cargos. Raw materials brought to the waterfront by rail and truck are stockpiled at the terminal facilities. The loading and unloading areas with their conveyors, giant gantries, and booms are dominant visual features characteristic of a port area. Bridges cross over the harbor area carrying cars, trucks and rail lines between the two cities. Large grain elevators on the waterfront unload hundreds of millions of bushels of grain each year into ships for export to foreign countries. The heights of many of these elevators and other structures are well over a hundred feet. Tank farms and bulk liquid storage facilities with their pipelines running to the water's edge are essential in the handling of petroleum products and other bulk liquid materials.

3.204 In many months of the year, bay ice provides the Sister Harbors with a landscape element few large urban areas have, abundant open space for snowmobiling and other activities. Shanties for ice fishing dot the bay throughout the winter months, giving the bay an especially curious visual appeal. All of these dominant visible and audible characteristics in the landscape work together to create the identity of Duluth-Superior.

3.300 Land Use and Zoning. The site of the taconite stockpile expansion is currently zoned as undeveloped. Existing land use adjoining the facility is primarily transportation and undeveloped land. A few houses are scattered along 42nd Street immediately northwest of the rail yard and storage area. The conveyor system abuts 2-family residences and general business district where the system passes through Allouez. From Itasca Street to the ore docks the area is zoned for light industry and industry.

3.301 Since the HOTL-COG study of land use in 1985 (HOTL-COG, 1967) classifies the expansion site as vacant, open space and transportation, the proposed facility expansion presents little conflict with projected land use.

3.302 The major area where the facility abuts residential land use is the narrow corridor where the conveyor system passes through Allouez from the stockpile area to the ore docks. Projected land use in 1985 changes nearly all of this area to a vacant area classification (HOTL-COG, 1967).

3.303 The proposed expansion of the taconite marine facilities is in conformance with the proposed land uses and existing zoning laws as they pertain to the lands along the south shore of Allouez Bay. Immediately adjacent to the proposed terminal are lands zoned for light industry and undeveloped open space. The tract east of 40th Avenue and north of Itasca Street zoned for industrial use is presently utilized by non-conforming residences.

3.304 The nearby undeveloped lands at the mouth of the Nemadji River, in the southeastern corner of Allouez Bay and along Wisconsin Point are presently used primarily for recreation, scientific research and some resource extraction. Allouez Bay and Wisconsin Point are under consideration for Department of Natural Resources (DNR) designation as scientific areas.

3.400 Recreation and Open Space. Recreation and outdoor activities are a major part of "life" in the Duluth-Superior area. This is indicated by the fact that 51 percent of the land within the Superior city limits is vacant. The harbor area presents unique opportunities for fishing, boating, hunting, snowmobiling, and other pastimes. The lakes and woods surrounding Duluth-Superior present these same opportunities and attract visitors from many parts of the United States.

3.401 There are presently 22 recreation areas in the city of Superior. These areas are shown on Exhibit 20 and described in Exhibit 21.

3.402 Future land use projected as open space is shown on Exhibit 22. This data was taken from "Guide to Metropolitan Growth" prepared by Head of the Lakes Council of Governments (1920). HOTL-COG (1970)

4.000 IMPACTS OF PROPOSED PROJECT

4.001 Evaluation of the proposed project's environmental impacts is divided into two general categories: construction and operation. Each of these is discussed in terms of the physical and socio-economic effects the project would have on the Duluth-Superior area.

4.100 Construction Related Impacts - Physical

4.110 Air Quality. When heavy equipment removes vegetation, levels the topography for stockpiles, and prepares the site for construction, dusty conditions will undoubtedly arise. Construction of the new stockpiles requires clearing of 100 acres; the total expansion includes 170 acres, not all of which would be cleared of vegetation. Although it is doubtful that this dust would be in sufficient quantities to create serious short-term air pollution problems, it is nevertheless desirable to control or eliminate dust-promoting conditions. Rapid laying of the gravel base of the stockpiles reduces the period during which the red clay is available for entrainment. Potential fugitive dust emissions would be controlled by application of water and/or chemicals to prevent particulate matter from becoming airborne. Where necessary and possible, asphalt or oil would be applied to construction roads and areas to prevent fugitive dust emissions. All feasible control measures would be implemented.

4.120 Noise. During the construction phase of the taconite facility expansion, various pieces of construction equipment would produce a myriad of sounds. The most intrusive of these will be the pile drivers with the rhythmic percussion of the pile driving process. For conventional pile drivers, the sound of the hammer as it drops onto the pile is the dominant noise component. Other sources include the release of steam at the head of the combustion explosion that actuates the hammer, depending on the type of driver. Peak noise levels tend to be near 100 dB(A) at 50 feet.

4.121 Additional noises will be created by earth-moving equipment. Although these noises are tolerable at best at close proximity to the construction site, it is not anticipated that noise from construction machinery would create substantial disturbance to nearby residential areas, with the exception perhaps of the construction of the conveyor system which will pass through residential areas. Construction machinery working near houses may create nuisance noise which might aggravate nearby residents.

4.122 For certain stationary equipment such as pumps, generators, and compressors, noise levels at 50 feet range from approximately 70 to 80 dB(A). Acoustic inclosures for these smaller pieces are available and, in fact, noise from air compressors has been reduced by about 10 dB on some models.

4.130 Dredging. Dredging would be conducted utilizing a dipper or hydraulic dredge. The dredge would pick up the material and place it on a scow. Periodically, the scow would be moved to the bulkhead and be unloaded using a clam shell dredge. The dredge material would be placed on the dock between bridge rails to allow dewatering. To prevent water from returning directly to the bay, a containment area would be built by building dikes between the bridge rails (distance between the bridge rails is 350 feet; the dock is 3,000 feet long). After dewatering the material would be hauled to the approved disposal site.

4.131 Dredging consists basically of removing aquatic bottom materials from one site and redepositing the same materials at another site. Before commencement of marine loading operations, a portion of the bottom materials which lie between the dock face and the federally maintained harbor channel will have to be removed to allow ships to tie up at the facility. It is anticipated that a dredge would be employed to lower the sediments to the required 28-foot depth. The total quantity dredged in this portion of the project would approach 150,000 cubic yards.

4.132 Minor negative impacts are associated with dredging operations but they are primarily restricted to a small area, and may be generally temporary in character (Ketchum, 1972). Excavating sediment from the proposed dock berthing area would not in itself effect any substantial long-term ecological degradation or environmental quality depreciation in the associated bays or Lake Superior. The effects of storm-generated shore currents or strong river flows dwarf the environmental impact brought about by the resuspension of sediments during dredging.

4.133 An immediate impact of excavating sediment from the channel is the physical alteration of the sediment-water interface in the channel and adjacent areas. Mechanical dredges dig into the sediments and, in the removal process, expose old sediments to the overlying water. In the process, nearly all bottom-dwelling organisms within the dredge's reach are either destroyed or displaced. The impacts of hydraulic dredging are generally similar to those of mechnical dredging except that turbidity may increase.

4.134 When a dredge is used to remove bottom materials, the amount of suspended silt, sand and detritus increases in the vicinity of the dredge. As sediment is excavated, large quantities of material are resuspended in the surrounding aquatic area. The turbidity indicative of this substantial release of materials into the water is associated with decreased available oxygen, further diminishing resources on which aquatic organisms are dependent.

4.135 Suspended organic materials and fine sediments disturbed in the dredging process may be easily transported by harbor and nearshore currents, and dispersed down current. Since the waters extending out from the harbor seldom leave the area of littoral currents, materials could be introduced to sandy bottom environments near the harbor. These materials are likely to be resuspended by wave and current action, since their grain sizes would allow them to be moved easily in the high energy environment of shallow nearshore waters.

4.136 The species present which inhabit the harbor bottom are pollution-tolerant organisms in populations which are adaptable to environmental qualities associated with dredging and pollution. Repopulation would rapidly follow dredging action, and will increase toward the carrying capacity of the habitat. The impoverished area will be repopulated by organisms from surrounding areas. The rate of repopulation will be dependent on such factors as the population levels and mobility of organisms in adjacent areas; duration of turbidity and substrate disturbance; current patterns; seasonal conditions; and predation. Ketchum (1972) considers these effects of dredging to be normally insignificant: 1) initial turbidity 2) smothering 3) oxygen depletion following dredging. Continued use of an area, however, as facilitated by maintenance dredging, may also maintain conditions of diminished biological value.

4.140 Dredge Material Disposal. **Impacts on the aquatic ecosystems will be** extremely local in nature, limited in all likelihood to the organisms between the docks and extending out to the harbor channel. The sediment near the ore docks supports the least diverse benthic community in Allouez Bay. Most of those organisms actually displaced by dredging activity would perish in the disposal site as the filling gradually transforms the site into terrestrial habitat. Surrounding aquatic organisms would probably not be greatly affected.

4.141 Terrestrial vegetation would also be affected by the creation of new land at the disposal site. Two acres of shoreline vegetation would be destroyed by raising the level of the land to five feet above lake level. Because of the relatively steep slope that characterizes the disposal site, the filling would not extend far inland from the existing shore. The vegetation which would be most affected would be willows, birch, tag alder, goldenrod, meadowsweet thistle, burdock, and cocklebur.

4.142 After construction dredging is completed, two-thirds of the site would be filled, pioneer weedy vegetation would become established. As part of the landscaping plan, the area would be vegetated to limit wind and water entrainment of particles. The new vegetation could be expected to be well established by the end of the second growing season. Subsequently, the vegetation would progress through the disclimax that characterizes the southern shore of Allouez Bay near the residential and industrial community.

4.143 Impacts to recreational activities that occur near the docks would be practically non-existent. The location of the disposal site obviates a long pipeline strung across the bay. Turbidity resulting from dredging would be localized near the docks which is not an area of frequent recreational useage.

4.150 Erosional Runoff. Before the construction of the unloading and stockpiling facility, the entire affected area would be graded, thereby stripping all of the existing vegetation. With the soil denuded, the area would be prone to erosion. Associated with erosion is degraded water quality.

4.151 Surface runoff carries soil particles to the stream channels. The particles furnish chemical and organic materials that exert an oxygen demand upon the stream's ecosystem. Suspended particles can cloud the water, decreasing light penetration and increasing heat retention. This can result in reducing or changing the diversity of stream life.

4.152 Transportation of these particles further downstream with swifter flows can cause scouring of the stream bed and increase bank erosion. This in turn affects the downstream portion of the stream by introducing even more sediments. If the sediment load is large enough, silting of the bottom may occur, reducing the number of desirable organisms and increasing the number of undesirable ones. In general, surface runoff and soil erosion can be equivalent to a waste discharge made up of concentrated, suspended organics and inorganics. Surface runoff differs from other discharges in that the flows are infrequent, seasonal, and vary greatly in quantity and quality. It is conceivable that turbidity would be a problem, especially if graded slopes are such that drainage occurs directly into the Nemadji River. This would increase the turbidity of the river and contribute to the many associated problems of increased sediment loads as they affect aquatic organisms. Nevertheless, several mitigating factors reduce the potential negative effects.

4.153 The area that would be stripped of vegetation has a very low gradient. The gentle, almost level, slopes which characterize the site inhibit the transport of the coarse fraction of the sediment for appreciable distances. The fine material would be transported further, some reaching the Nemadji River and Bluff Creek; however, the vegetative surfaces that surround the construction site would also inhibit sediment runoff. Additionally, the stripped area would be covered with gravel (to serve as the base for the stockpile); if the base is laid down immediately after grading, sediment runoff would be reduced. This gravel base consists of 18 inches of pit run gravel overlain by 12 inches of 8-inch minus lean ore with a top layer of 6 inches of 2-inch minus ore tailings.

4.154 Some sediment will reach the Nemadji River and Bluff Creek. Water quality data presented shows that these two streams are already highly turbid. The turbidity results from the existing land use, only a small part of which can be traced to the existing taconite facility. Because the Nemadji River and Bluff Creek are already turbid, the aesthetic impact, the impact on stream ecosystems, and the impact on recreational activities by this facility during the construction period would be minimal. There is no evidence to indicate a critical threshold affecting aquatic life forms would be approached or surpassed.

4.160 Alternatives for Dredge Material Disposal. Several alternative sites have been investigated for suitability as dredge material disposal areas.

4.161 One alternative (No. 1, Exhibit 2), as discussed in the Public Notice, would be to construct an impermeable containment dike along the eastern side of the C. Reiss Coal Dock. The trapezoidal-shaped site covers approximately 14 acres and will be filled to a height 5 feet above lake level. The site has capacity for 100,000 cubic yards or about two-thirds that required for dredge material disposal. Consequently, additional area for disposal would be needed (Exhibit 5).

4.162 Should this site be used, the adverse impacts associated with dredging would still occur. However, the 2 acres of terrestrial habitat would be preserved in its present disturbed state. Further, alteration of 8 acres of aquatic habitat to terrestrial habitat would not take place. However, 14 acres of tag alder, dogwood, willow and railyard marginal lands will be destroyed. Vegetation on the railyard margins is dominated by young willow saplings, aster, goldenrod and dense grasses. No significant population of mammals will be affected.

4.163 To minimize the influence of the sediment's pollutional characteristics, the impermeable dike wall and resulting basin would allow settling of most suspended particles before excess water returns to the Bay ecosystem. A system of weirs would allow for gradual release of the water to reduce turbidity.

4.164 Another alternative (No. 2, Exhibit 2), as discussed in the Public Notice, is a temporary storage area using 2 feet high concrete bridge rails to contain the sediment in a 16 acre rectangular area on the west side of the C. Reiss Coal Dock. The temporary stockpile area is near the southern end of the dock. After water drains from the dredge material, it would be transported to the upland disposal site described in paragraph 4.166.

4.165 The temporary containment site was formerly used for coal stockpiling and includes areas with willow saplings, aster, goldenrod and dense grasses. This vegetation would be smothered while the dredge material is placed in the containment area. After construction is completed, vegetation similar to the existing, highly disturbed community would be reestablished. Periodic maintenance dredging would further disturb the vegetation that invades the stockpile site.

4.166 The site considered for upland disposal would be on the south side of the taconite stockpile area, bounded by the old railroad and the proposed railroad line. It would cover about 11 acres and have a capacity for approximately 160,000 cubic yards. This alternative would be the most costly method of dredge material disposal.

4.167 The upland site is generally similar to the proposed taconite stockpile area, and the impacts associated with the stockpile would apply in this case. The site would be partially affected by the construction of the new railroad line (to the stockpile area) even if it were not used as a disposal area. The major benefit which could be derived from the use of this site is the elimination of any contact with the harbor shoreline ecosystem.

4.168 A third alternative (No. 3, Exhibit 2), involves utilizing diked disposal on approximately 10 acres outlined by the pilings of docks No. 1 and No. 4 and the connecting walkway. The area has a capacity for about 75,000 cubic yards of material. The remaining 75,000 cubic yards would be used as a base for the proposed taconite stockpile and would help prevent foundation failures such as those experienced at other stockpile locations.

4.169 The existing disturbed field vegetation on 1.7 acres of land immediately adjacent to the shoreline of Allouez Bay would be covered with dredge material. The weeds and small saplings that are currently growing in the storage area would be destroyed. An additional 8.3 acres of aquatic habitat would also be lost. The benthos present would be smothered. The area near the ore dock does not support a diverse or large benthic population.

4.170 Impacts on water quality would be minimized by construction of the impermeable dike prior to disposal of the dredge material. Dike construction would result if turbidity increases. The increase would neither be long nor excessive for that environment. During disposal of the dredged material in the containment area, excess water will be detained until the water quality meets the standards established by the authorizing permit.

4.171 Both the Environmental Protection Agency and the United States Fish and Wildlife Service have expressed their preference for disposal site alternative No. 3.

4.200 Construction Related Impacts - Socio-Economic

4.210 Economics. Duluth-Superior is an economically depressed area. Unemployment rates are high, with an average of nearly 4,000 people out of work each year for the past several years. With high unemployment and substantial numbers of people in need of public assistance, a project which will have favorable economic impact should give a boost to the local economy of the Superior area.

4.211 Favorable economic impacts, both direct and indirect, can be expected during the construction of the expanded taconite transshipment facility. Construction workers hired from the local labor force would spend portions of their disposable income in the local economy. Spinoff benefits would occur as the money changed hands within the community. Taxes would benefit the communities in which the workers reside. The local purchase of construction materials and supplies would also create direct and spinoff economic benefits.

4.212 Total capital costs for complete construction of the taconite transshipment facility are estimated to be $40 million for materials, labor and related costs. Of this amount, approximately 60 percent, or about $24 million would be spent in the immediate Duluth-Superior area in the form of wages and fringe benefits to construction workers, materials and supplies purchased locally, and the like. These are "primary economic impacts" which will be the first round of economic benefits to the local economy.

4.213 Primary employment during the construction phase would amount to approximately three hundred construction jobs at peak. This employment peak would be reached during the second quarter of 1976 and would continue through the third quarter of 1976, according to Burlington Northern's proposed schedule, would follow after which would come a dropdown until construction is complete (June, 1977). During the winter, construction activity would be approximately 70 percent of the summer level.

4.214 After the primary economic impact is established, it is important to determine what the impact will be in terms of secondary income generated. Indirect impacts would consist of secondary economic activity generated by the circulation of this new income injected into the local economy. This means that for each dollar of primary income expended, a certain number of dollars are generated as the money is spent again and again.

4.215 The method used to determine the economic "base" industries for Superior and the secondary income "multiplier" is discussed in Exhibit 23.

4.220 Community Disruption. Construction of the new loop track and stockpiles would create little interference with motor-vehicle traffic other than an increase in heavy truck traffic during some of the construction phase. No major access routes would be disturbed during construction of the loop track or the stockpile.

4.221 The new conveyor would follow the route of the existing belt through a portion of Allouez. Construction of this new conveyor may cause some minor disruption of traffic. This would affect the streets from East 3rd Street to Itasca St. and between 38th Ave. and 40th Ave. Disrupted streets include East 2nd St. (U.S. Highway 2 and State Highway 53). The importance of the latter artery necessitates rapid construction of the conveyor system in this critical area to minimize the period of disruption. In addition, construction activities need to be adjusted to minimize the delay time of traffic passing along East 2nd St.

4.230 Aesthetics. Much that will occur during the construction of the taconite transshipment facility might be considered to be an aesthetic impact. Perhaps the most significant response might be the reaction of people to changes in the visual nature and character of the site. The significance of this impact is dependent upon many variable factors, not the least of which is the attitude of the people of Duluth-Superior toward the proposed project.

4.231 Among the first occurrences would be the preparation of the site for construction. This would involve removal of vegetation and leveling of topography. The area to be altered for the stockpile would be cleared of vegetation, although a buffer strip of existing trees and shrubs would be left along 42nd Ave. on Burlington Northern property to screen the view of the future stockpiles. Because of these visual barriers, the isolation of the area from Allouez, and the absence of development on the surrounding land, very little visual impact would occur.

4.232 Also occuring during construction would be the assembly of the new conveyor equipment alongside the route of the existing conveyor, to a point near the northeast corner of the intersection of Itasca St. and 39th Ave. Here the new conveyor would depart from the route of the existing conveyor at a transfer point. It would run perpendicular to the existing conveyor to the C. Reiss Coal Dock. The conveyor would then run north along the west side of the dock, to the bins and other shiploading equipment.

4.233 During this period, the existing conveyor would be inclosed over approximately 3,000 feet (and the new belt 4,000 feet) of its length as it passes through Allouez. Although it is designed primarily to control dust, the inclosure would significantly improve the appearance of the conveyor. Construction of the new conveyor system and the inclosure of the existing conveyor would likely require visual adjustments, especially for people living and working in the Allouez area, to the new visual elements introduced into their environment as well as changes in existing visual elements to which those people have become accustomed.

4.234 The third segment is the dock area. During preparation of the site and actual assembling of the ship-loading equipment, new activity on previously vacant land and the gradual appearance of new vertical and horizontal visual elements would require adjustment and solicit acceptance from the people of the area.

4.235 The construction period would span approximately 24 months. Construction activity would take place in the stockpile area, on the new conveyor belt and on the new dock area. While little activity in the stockpile area would be seen by the public, they would be able to see the site preparation work and the erection of equipment for the conveyor and for the ship-loading areas. This impact would last for the duration of the construction period.

4.300 Operation Related Impacts - Physical

4.310 Air Quality. The only significant pollutant emitted by the proposed taconite terminal would be fugitive dust (particulates) resulting from the bulk handling and storage of the ore. At the regional level, the amount of dust is anticipated to be of small magnitude and should blend into background particulate readings. The assumption of little impact is entirely predicated on the proposed dust control measures to be implemented at the terminal.

4.311 Minor environmental problems resulting from the additional hauling of the taconite to the proposed terminal in Superior (Allouez), Wisconsin, relate to the track corridor which runs from Hibbing, Minnesota, to Allouez. Items of concern include air pollution from the diesel locomotive exhaust emissions and air pollution in the form of particulates from the loaded, open taconite cars.

4.312 Air pollution generated by an increase in vessel traffic in the harbor is expected to be negligible when compared to other sources of pollution in the harbor area. Pollution control devices are constantly being improved and this fact should lead to a decrease in pollution caused by exhaust emissions.

4.313 Pulmonary disorders ensue from the inhalation of dust which has a high concentration of free silicon, silicon dioxide, asbestos or heavy metals but there is insufficient evidence available to establish the appropriate levels applicable to taconite. At low levels of concentrations, these impurities may serve to aggravate existing serious pulmonary diseases of older people or newborns. For the existing and proposed facilities, the extremely low levels in which trace elements are expected should not pose any problem to the maintenance of proper health of workers and nearby residents.

4.320 Water Quality. Water quality problems created by the expanded facility include leachate and runoff from the stockpile area, turbidity and nutrient release from maintenance dredging and vessel movement, and discharges and spills from marine vessels.

4.321 As with air quality, regional water quality impact is expected to be of minimal significance with the abatement system designed for the facility. Runoff and leachate testing (Exhibit 24) has shown only minor tendencies toward the release of the elemental metals which are present in the taconite. There is the possibility of the build-up of these metals as metal compounds at or near the mouth of the Nemadji River.

4.322 The metals are deposited in layers mixed with other inorganic and organic sediments. Continuing sedimentation buries the deposits, allowing chemical and biological action in the anerobic environment of the bottom deposits which could introduce the metals into the lower echelon of the bay ecosystem. Changes in species diversity and density at this level could occur, and/or the metals could be carried up through to the higher echelon members of the bay ecosystem. Either of these occurrence could have detrimental effects on the harbor and adjacent parts of Lake Superior.

4.330 Landscape Alteration. During construction at the proposed taconite terminal site, approximately 100 acres of terrestrial habitat and open space would be stripped of its vegetation ground cover to prepare a level surface for the stockpiling of taconite. The elimination of this habitat would occur during the initial stages of the construction phase. Plant communities, along with their faunal associations, would be lost. Nearly all landscape alteration impacts would start during the construction phase; operation of the facility would continue the impact with few modifications. Since the site is nearly level, there would be little topographic alteration required.

4.331 The proposed stockpiling site would be stripped of its mesic woodland, composed primarily of alder, populus, willow and birch cover, fern and herb understory, and mesic soil flora. Neither the tree crop nor the herb associations have much economic value at this time. Low spots in which standing water occurs during wet seasons would be filled during grading operations, eliminating habitats for insects, other invertebrates, amphibians, and various other small vertebrates. Loss of tree cover, plant and invertebrate food would further affect animal populations. Construction may bury occasional rodents, while causing other mammals and birds to emigrate. Specifically, these vertebrates are most likely to include cottontail , snowshoe hare, deer, woodpeckers, sparrows, finches, jays, robins, and pheasant. (The list is incomplete; it is intended to give an idea of the "quality" of animal life which may be disturbed.) Since home ranges of occasional deer, rabbits and certain birds include areas whose landscapes would not be altered during construction, shift in range is possible. Increased competition may occur in surrounding areas when emigrating animals enter niches already occupied or used. From the construction phase onward, the project site would be essentially uninhabitable by plant and animal populations. Residual standing water within the stockpiling area may be used by nuisance organisms, but continuing alterations within the site may eliminate these small areas.

4.332 The already disturbed early succession terrestrial habitat along Allouez Bay would be further disrupted by additional conveyor belt construction. This includes patches of mature populus trees, dogwood, willow, berrybushes, cattails, composites, moisture-tolerant grasses, and other herbs. The strip of destroyed vegetation has no value in terms of economic forestry potential. Animals whose home ranges would be altered or disturbed may include all the small mammals and field or woodland birds listed in Exhibits 21 and 22, although the number of organisms actually disrupted would be small.

4.333 During the operational life of the proposed taconite terminal, precipitated sediments from the Nemadji River and Bluff Creek will gradually fill all or part of the ship berthing area along the pier face. This will necessitate periodic maintenance dredging by the terminal owner in order to allow the taconite carriers continued access to the facility. The amount of material to be removed by these dredging operations and the frequency of dredging required would vary with the sediment load in the river, the local currents, and the effects of propeller wash on the bottom sediments. Local dredging operators indicate that a 1- to 3-year frequency should be expected, at which time 5,000 to 15,000 cubic yards of sediments would be removed.

4.334 The environmental impact of maintenance dredging and dredge material disposal is caused by the displacement of sediments from the pier-side berthing area to contained dredge material disposal areas. Removal of the sediment itself contributes temporarily to diminishing the overall biological quality in the associated lake environment.

4.335 Minor disruptions to recreational activities in the harbor could occur as a result of maintenance dredging. The shuttling of dredges and barges to the disposal site adds to the traffic in the harbor and bay and creates obstacles to the movements of recreational watercraft.

4.336 The movement of ore carriers to and from the new taconite pier would cause some degradation of local water quality and would disturb segments of the aquatic ecosystem. The churning of the waters by the carriers' propellers would suspend quantities of bottom sediments, causing increased local turbidity. Benthos dwelling in those areas subjected to the force of the propeller wash would either be removed or substantially disturbed by this action.

4.337 Much of the aquatic environment in which this disruption would occur is currently subjected to disturbance by the 240 vessels which use the existing docks annually. The scarcity of benthic species at or near these existing ore docks (Exhibit 25) documents the presently disturbed nature of this environment. The location of the new ship loading facilities to the southeast of the existing ore docks at the present C. Reiss Coal Co.

Dock, would serve to extend the area of disturbance further into Allouez Bay. It should be noted too, that past shipping activities at the Reiss Dock and at the Chicago Northwestern Dock have already caused disturbances in Allouez Bay. These previously disrupted arms will probably be those most directly affected by the new scouring action of the prop wash.

4.340 Noise. If the proposed new conveyor system is built, both it and the present conveyor system would be inclosed through the community for purposes of dust control. If the walls and roof are adequately constructed, this structure should provide an estimated noise reduction of 15 db. This data has been extrapolated to predict noise levels associated with the expanded facility.

4.341 Combined with the one train per day operation of the existing facility, the daily operating time of the conveyors at the expanded facility would be approximately 16 hours, including several hours when both conveyors will be operating simultaneously. Under these conditions the noise exposure at distances greater than 50 feet from the conveyor belts would still fall within the HUD normally acceptable range even if uninclosed. In terms of L level of 55 db proposed by EPA, residences within 700 feet would be affected if the conveyor is not inclosed, but no residences would be affected if the conveyor is inclosed.

4.342 As the capacity of the new facility is increased to its final maximum of 17.9 million long tons and the operating time of the conveyors is increased, areas more than 60 feet from the conveyor would still fall within the normally acceptable range of the HUD standards even if the conveyor was not inclosed. A 55 db L level at a maximum of 800 feet from the conveyor would be expected with no inclosure, and a maximum of 50 feet from an inclosed conveyor. Judged in terms of the EPA recommended day-night level of 55 db, approximately 90 residences would be affected if no inclosures were used, whereas no residences would be affected if the inclosures were used.

4.343 As another control measure, the effects of plants on noise should be considered. Plants, especially in densely vegetated belts may relieve sound problems by absorbing, scattering and masking noise. (Robinette, 1972). Because their actual capabilities are now being specifically evaluated and documented, it is now possible for intentional plantings of various trees, shrubs and herbs to be designed into site plan with some assurance of noise impact reduction.

4.344 Most noise associated with vessel operations is confined within the ship. The operation of propulsion machinery, pumps and related machinery creates considerable noise, but for the most part it is confined to the engine room spaces.

4.345 The only other noise sources which may be significant are the shuttle conveyors to be located on the ore dock for ship loading. Equipment of this type has not been measured; however, a few general comments may be made concerning these sources. Noise levels in the near vicinity of each conveyor unit (10 to 15 feet away) are likely to be near 75 dBA plus or minus 5 dB. The dominant noise sources would probably be the drive mechanism and the noise of falling pellets. Depending on the arrangement of the shuttle conveyors on the dock, the expected noise level at a residence 3000 feet away would be near 55 dBA.

4.350 Landscape. A program of planting vegetation barriers to act as a year-round visual screen would be implemented toward the end of the construction phase. The program would mix some deciduous trees and shrubs with the evergreens (needed for year round screen) in a variety of sizes to produce some "immediate effect" and a natural appearance overall. Plant species to be selected would be of the type native to the Duluth-Superior area.

4.351 In several specific areas larger trees would be planted for a more immediate screening effect. This would take place in the area where maximum visual impact is expected.

4.352 The area to be planted amounts to approximately 9.8 acres. In addition to this planting effort, other areas have been designated as "preservation" areas where existing vegetation would be protected. This will allow natural visual barriers to develop. The acreage involved in preservation areas amounts to 7.2 acres.

4.353 The coverage of the vegetation should significantly reduce the visual dominance of the conveyor system through a substantial area of Allouez as well as concealing nearly all of the stockpiling operations.

4.400 Operation Related Impacts - Socio-Economic

4.410 Economics. Continued favorable economic impacts both direct and spinoff, can be expected if the transshipment facility expansion becomes operational. These impacts would be long-term. Employees would spend portions of their disposal incomes within the local economy. Spinoff or secondary impacts would occur as wages are passed from laborer to storekeeper along the economic chain. Taxes on earnings would benefit the communities in which the workers reside. Supplies and maintenance materials purchased locally would also contribute dollars to the local economy.

4.411 The projected level of employment for the operational phase of the proposed taconite transshipment facility expansion is approximately

60 new positions, with employees to be hired from the local labor force. These positions would, for the most part, be year round, full-time employment opportunities. Non-navigational employment levels would be approximately 50-55 and this would increase to 60 or 70 during the shipping season when ship loading operations are taking place. There would be three shifts with approximately one third of the work force working each shift.

4.412 In addition to those 60 jobs directly related to the daily operations of the facility, there would be secondary or service jobs created in other segments of the economic community. Using the economic multiplier 1.90 (See Exhibit 20) it can be anticipated that approximately fifty-four service jobs would also be created bringing the total to 114 new employment opportunities to the area. This amounts to nearly 2.85 percent of the annual average unemployed in the area.

4.413 Annual payroll for direct employment at the 17.9 million ton throughput level would be approximately $1,400,000. This money would be spent by these 60 wage earners and it would change hands many times within the community until an estimated total dollar impact (using the 1.90 multiplier) resultant from wages along would approach $2,660,000.

4.414 In addition to the economic impact of increased employment and the flow of dollars for wages, would be the additional taxes paid with respect to the assets being used at the expanded facility. It seems reasonable to assume that the central assessment for the expanded operations by the State of Wisconsin would increase by 1977. While it is impossible to estimate the exact tax that will be paid with respect to the new facility, the taxes on the expansion would likely be more than the $190,000 paid on the existing facility in 1974.

4.415 Annual expenditures for operations at the expanded facility would include maintenance, electrical power, fuel, and taxes. Table 4-1 shows expected annual operating expenses for the 17.9 million ton throughput operational level. These dollars would benefit the economy of the Duluth-Superior area.

TABLE 4-1

Anticipated Annual Expenditures
Into the Duluth-Superior Economy
From Expanded Taconite Transshipment Facility Operations
17.9 Million Ton Throughput Level

		Expenditure
Payroll		$1,400,000
Maintenance		499,000
Electrical Power		394,000
Fuel		17,000
Property Tax (estimate)*		190,000
	Total	2,500,000

*Based on total tax paid during 1974 with respect to the existing facility, it is reasonable to assume that the tax would increase substantially when the new facility is in operation; however, it is impossible to estimate an exact figure.

4.416 Using the 17.9 million ton throughput level, total expenditures listed in Table 4-1 yield a total primary economic impact figure of approximately $2,500,00. Applying the calculated economic multiplier of 1.9 to the $2,500,000, results in an estimated total impact on the area economy of $4,750,000.

4.417 These economic impact projections are based solely on the contributions to the Duluth-Superior economy from the operations of the terminal itself. Other positive economic impacts would occur as a result of this project. Additional employment opportunities would likely be created to provide additional train crews for the rail haul to Superior. In the lake shipping segment additional vessels and crews would likely be needed to transport the increased tonnages to the steel mills. Some of these personnel may be hired from or reside in the Duluth-Superior **area. Clearly, the general economic impact of operations of the** taconite transshipment facility expansion will be positive, and long-term.

4.420 Community Disruption. Once the expanded portion of the facility becomes operational, very little if any impact would occur which would disrupt community activities in Allouez. One facet of operations which might be of major concern would be traffic interruption and delay caused by unit train delivery of pellets. These trains would be coming into Allouez from the south. At the present time, approximately seven taconite unit trains per week make the run from Hibbing, Minnesota, to Allouez, Wisconsin. The route followed by the trains passes through some small towns and villages with at-grade crossings. With speeds of approximately 30 mph, normal delays to highway traffic amount to less than five minutes for each crossing. There are no intended stops of the trains other than for emergencies.

4.421 In the immediate vicinity of Allouez there are no significant problems of traffic delay because the trains do not block any major highways. The area south of Superior is largely undeveloped.

4.422 There would be no effect on community activity in the form of disruption from the stockpiling operations because it is isolated from the rest of the community.

4.423 Shiploading operations would continue to take place at the present ore docks as well as the ship loading which would occur at the new dock. No interruption to the community is anticipated due to this activity. Additional vessel calls to the new dock would increase ship traffic in this portion of the harbor but this should not adversely affect Allouez.

4.430 Aesthetic. Visual impact resulting from operations of the facility should be minimized as a result of the aesthetic controls included in the proposal. Stockpiling operations would be isolated from public view by the vegetative barrier to be retained on Burlington Northern property along 42nd Ave. between the road and the stockpiles. Inclosure of a portion of both conveyors as they pass through Allouez would improve their appearance. Surface treatment of the conveyor inclosures and the proposed selective landscape treatment would significantly reduce possible aesthetic impacts resulting from introduction of these new visual elements by "softening" their appearance. In addition, proper landscape planning would selectively screen views of the docks.

4.431 Construction of the new conveyor system and the inclosure of the existing conveyor would likely require visual adjustment of the people living and working in the Allouez area. Adjustment to these new visual elements introduced into their environment, changes in existing visual elements to which those people have become accustomed, and the acceptance of these changes, is dependent upon two things. First is the effectiveness of the aesthetic controls, and second are the attitudes of the people toward the project.

4.440 City Services. Very little demand for the city of Superior's services would result from operations at the facility. Water for drinking purposes is presently supplied to the dock area by the city water system. This would likely be true for the new dock as well. However, the quantity of water involved would be relatively insignificant. All industrial water now used as well as that required for the new facility would be supplied by Burlington Northern's own wells in addition to water pumped from Lake Superior and treated in Burlington Northern's lime soda plant located under existing ore Dock #2.

4.441 Sewage disposal would continue to be through septic systems and filter beds on site. Industrial wastewater is treated on site and discharged either through private lines to Bluff Creek or directly into Allouez Bay.

4.412 Solid waste is hauled by Burlington Northern personnel to a landfill disposal operated by the city of Superior. This practice would continue. Quantities are considered insignificant.

4.413 Electrical power required to operate machinery would be supplied by Superior Water, Light and Power, a private utility. Should emergency services be required in the event of accident or fire, those services available from the city of Superior or from Douglas County would be requested.

4.450 Toxicological Effects of Taconite Dust. An accurate analysis of the possible health effects of taconite dust requires a determination of its constituent trace elements and impurities. Trace elements contained in taconite samples are described in exhibit 24. There is no clear evidence that the concentrations of trace elements in taconite dust would be identical to the concentrations in the taconite itself.

4.451 Previous analyses of taconite pellets from the National and Butler Mines showed high levels of manganese and aluminum. Reference texts on the toxicological ffects of industrial metals (Dunn, 1963 and Fairtrall, 1957) generally list these elements as being non-toxic except at extremely high concentrations. Threshold limit values (TLV) have been established for materials which exhibit adverse physiological effects. The TLV is defined as that value below which no appreciable health damage occurs. Though a TLV of 50 mppcf (million particles per cubic foot) is given for aluminum, much medical information exists to show that generally, there is no noticeable physiological damage below the TLV. In essence, there is no reason for abnormal alarm when a known toxic substance is far below the known TLV.

4.452 Leachate analysis shows that the presence of such toxic elements as beryllium lead, cadmium and arsenic in taconite dust will be present in concentrations several powers of magnitude below any established TLV. Other trace elements, such as copper, chromium and zinc, will not only be present in extremely small quantities but are even listed as essentially non-toxic metals.

4.453 Silicon dioxide and asbestos, the two most potentially toxic substances found in taconite dust, will not exceed the accepted Threshold Limit Value (TLV) which have been published in the Federal Register (18 October 1972, p. 22142). It is also unlikely that the TLV's have been exceeded in the past.

The TLV 8-hour exposure for SiO_2 is calculated by the following formula:

$$\text{Quartz (Total Dust)} = \frac{30\ mg/m^3}{\%\ SiO_2 + 2}$$

The highest value, taconite produced by Butler contains 5.51 percent silica and the National taconite contains 4.86 percent silica. Using this yields a maximum allowable dust level of 3.99 mg/m^3 (assuming all SiO_2 is free silica).

$$\frac{30\ mg/m^3}{5.51 + 2} = \frac{30\ mg/m^3}{7.51} = 3.99\ mg/m^3 \text{ allowable dust level}$$

4.454 The predicted worst case in Allouez at the 17.5 mlt level of operations is 86 $\mu g/m^3$ or 0.086 mg/m^3. In 8 hours this is equal to 0.258 mg/m^3 of particulates. Thus, the allowable dust level for exposure to silicon dioxide from taconite dust at the 17.5 mlt level of operation is 15 times the projected dust level.

4.455 When the facility handles 22.9 mlt throughput, the worst case of 24-hour emissions is 111 $\mu g/m^3$ in Allouez. This is equivalent to 0.111 mg/m^3. An 8-hour exposure to dust, then, is predicted to be 0.333 mg/m^3 which is 3.657 mg/m^3 below the TLV. The dust suppression systems to be implemented at the site will adequately protect both the workers and the residents of Allouez from SiO_2 particles; the allowable dust level is approximately 11 times the projected dust level.

4.456 Asbestiform amphibole fibers were also identified in taconite dust. To analyze the levels of these fibers, the following discussion uses the existing standards for asbestos fibers. The leachate obtained by a dry shaker test from both National and Butler pellets were examined on a polarizing light microscope by Walter C. McCrone Associates, Inc. Results show the samples consist almost entirely (99 percent) of iron oxides. In the Butler pellet sample, however, a considerable number of asbestiform amphibole fibers were observed ranging in size up to 20-30 μm in length.

4.457 To further document the presence, and to quantify the levels of asbestiform fibers, the samples were examined under an electron microscope. Weighed portions of the powders were suspended in a known volume of water and the suspension filtered through Millipore membrane filters of 0.45 μm pore diameter. Electron microscope samples were prepared by direct transfer method in which a portion of the filter is dissolved in situ on the electron microscope grid. These electron microscope grids were then examined in the JEM-200 KV transmission electron microscope.

4.458 In the sample of Butler pellets, six asbestiform fibers were observed in an area of 13 grid squares and, allowing for the dilution factors introduced in preparing the sample, this correlates with a total fiber concentration of 2.8 X 10^7 fibers per gram. In the sample of National pellets only one fiber was observed in 20 grid squares. This represents a fiber concentration of 3.5 X 10^6 fibers per gram.

4.459 The permissible exposure to airborn asbestos fibers, effective 1 July 1976, is given in the Federal Register (16 October 1972, p. 22142) represents an 8-hour, time-weighted exposure. The exposure shall not exceed (2) fibers, longer than 5 μ per cubic centimeter of air. This is equivalent to 2 million fibers (particles per cubic meter (2 mppcm).

4.460 Again, the maximum predicted concentration at 12.5 mlt throughput is 86 mg/m^3 above ambient dust levels. Butler ore contains 2.8 x 10^7 fibers per gram. National ore has somewhat lower concentrations, and so Butler results will be used.

$$2.8 \times 10^7 \text{ fibers/g} = \frac{2.8 \times 10^7}{10^6} = 28 \text{ fibers}/\mu g$$

86 $\mu g/m^3$ X 28 fibers/μg = 2,408 fibers/m^3 = 0.0024 fibers/cubic centimeter (fpcc).

For 8-hour exposure: 0.0024 fpcc X 24/8 = 0.0072 fpcc, this represents a safety factor of 278.

4.461 When throughput increases to 22.9 mlt, the worst-case for 24-hour dust emissions in Allouez is expected to be 111 $\mu g/m^3$. Following the same calculations as above, the predicted level of asbestos form amphibole fibers is equal to 0.0093 fibers/cubic centimeter, or a safety factor of 214.

5.000 PROBABLE UNAVOIDABLE ADVERSE EFFECTS

5.100 Construction Impacts.

5.110 Dredging. The physical act of dredging is not normally adaptable to abatement procedures. Organisms residing on or in these sediments would be destroyed by the dredging operations. Sediments would be added to the surrounding waters as the result of dredging. This increase in turbidity could cause the temporary out-migration of motile aquatic species which presently utilize the waters above and near the dredging sites. Pollutants which are chemically bonded to the re-suspended sediments may become reintroduced into the aquatic system due to either the physical buffeting of the dredging act or through a change in their surrounding "chemical" environment.

5.111 All the negative impacts associated with dredging for construction are expected to be short-term in duration, lasting for only the period during which dredging is actually taking place. The removal of a portion of the bottom dwelling organisms of the aquatic ecosystem should be inconsequential. Benthic organisms from the surrounding undisturbed sediments may be expected to provide species members for the recolonization of the dredged areas.

5.120 Dredge Material Disposal. The dredging and filling would affect the quality of the aquatic environment through the permanent destruction of approximately eight acres of aquatic habitat and the concomitant formation of eight acres of terrestrial habitat. These activities would destroy the benthic community at the site, resuspend quantities of overlying sediments, and change the chemical equilibrium at the sediment-water interface. Local currents and sediment deposition patterns carry these effects to adjoining areas. None of these negative impacts should be long-term, nor should they represent significant degradation of Allouez Bay's aquatic ecosystem.

5.130 Landscape Alteration. Approximately 100 acres of woodlands to the southwest of the existing taconite stockpiles and Allouez shorelands would be cleared and altered to permit the construction of various segments of the expanded taconite facility. Included are: the stockpile area, the loop truck railbed, and the conveyor belt system. Mammals and birds residing in these lands would be destroyed or displaced to adjacent lands, thus placing a potentially temporary population overload on the surroundings.

5.140 Noise. Various pieces of equipment used during the 24-month construction period would add to the existing background noise levels. The most significant noise producers would be used for the conveyor belt and marine terminal construction activities. Other noise producers would be: pumps, generators, compressors, and other construction machinery. Attempts will be made to control and minimize the noise emissions through the use of mufflers, inclosures, and the scheduling of particularly noisy processes for the daytime work hours. These controls will not, however, totally suppress construction-related noise.

5.150 Community Disruption. Construction of the new conveyor system and the construction of the inclosure for the existing conveyor belt would cause disruption for segments of the Allouez community. Traffic on U.S. Highway 2 would also be interrupted by the cross-flow of construction-related vehicles moving from the stockpile area to the marine terminal.

5.200 Operational Impacts.

5.210 Air Quality. Because the project includes controls for the existing facility, dust emissions are predicted to ultimately decrease over 50 percent in Allouez (see exhibit 33). Concentrations at the present operation exceed the secondary standards but are below the primary standards. When the new controls are instituted, the emissions will be below the secondary standards as well.

5.220 Maintenance Dredging. A temporary degrader of water quality from the operation of the proposed terminal would be the periodic maintenance dredging at the dock face. The materials removed from this area would be placed in a suitable disposal site in order to contain turbidity and pollutants. Water quality and aquatic ecosystem impacts should be similar to those previously described, except that they would be on an even smaller scale. None of the adverse impacts of the maintenance dredging operations are expected to significantly alter the aquatic ecosystem or the water quality of Allouez Bay.

5.230 Vessel Movements. Propeller wash from calling ore carriers would cause turbid water conditions to persist in the vicinity of the proposed shiploading facility and in sections of lower Allouez Bay. Benthic organisms in these areas would be continually disturbed by the scouring force of the wash. In general, the impacts to the aquatic environment would be similar to those associated with maintenance dredging. However, the propeller wash impacts would be of a substantially longer duration due to the constant flow of traffic at the terminal during the shipping season. None of the adverse impacts from vessel movements are expected to make significant changes in the Allouez Bay aquatic ecosystem which is already acclimated to such activities.

5.231 Traffic associated with the proposed terminal should amount to two or three additional vessels, at most, each day. Impacts associated with the transportation of taconite could result from the overboard discharge of wastes; accidental discharges of cargo and fuel: and increased traffic on the lakes. Commercial vessels are subject to a number of pollution abatement regulations as set forth by both Federal and State agencies. Accidental discharges are unintentional and vessel operators attempt to take all precautions to avoid such accidents. The accidental discharge of taconite would have only a minor temporary environmental impact because the material is a solid and could be dredged from the lake bottom.

5.240 Runoff and Leachate. Runoff and leachate from dust suppression sprays as well as stormwater from storms up to and including the 25-year, 24-hour maximum will be retained in two ponds located in the stockpile areas. Design considerations of the ponds allow for complete runoff containment which will result in the settling out of suspended solids. The water will be used for irrigation of the "greenbelt" areas, or reused as dust supression spray. Excess water would eventually evaporate.

5.250 Noise. Operation of the conveyor, which passes through Allouez, would be heard by residents who live nearby. There are no regulatory standards in effect which apply to noise generated by the facility. However, application of HUD criteria and the proposed EPA noise standards to the conveyor reveals that no houses would experience noise levels above either set of standards. The belt inclosure, whicn is designed to control dust emissions, would reduce noise levels below that presently emitted.

5.260 Aesthetic. Any adverse visual impacts resulting from operation of the facility are minimized by the mitigating factors included in the project design. These include vegetative barriers and conveyor inclosures.

6.000 ALTERNATIVES TO THE PROPOSED ACTION

6.100 National Alternatives.

6.110 All Rail Haul of Taconite. Hauling processed taconite pellets from the Mesabi Range mine sites to the major consuming steel mills in the lower Great Lakes Basin by rail is a technically feasible alternative. At present 200,000 to 300,000 long tons of taconite pellets are annually handled in this manner by Burlington Northern. The reasons for the present all-rail hauls generally result from short-term increases in a specific mill's needs for raw materials which cannot be met by the available lake ore carriers or by taconite from other supply sources. These hauls appear to be especially common during the winter months when the ore carriers are not operating.

6.111 The effects of converting the entire, or even a significant portion of the Burlington Northern taconite tonnage to all-rail haul would be numerous. The railroad itself would be faced with major equipment shortages, particularly hopper cars and diesel locomotives. To rectify these shortages, large capital expenditures, with associated resource consumption, would be required. Personnel to operate and maintain the additional equipment would have to be recruited, trained and dispersed along the major haul routes. Railbeds would probably require substantial improvements and constant up-keep in order to safely accomodate the increased traffic they would be subjected to. In addition, money previously spent on shiploading, rail car dumping and stockpiling equipment and equipment maintenance at the Allouez facility would be largely negated. Exhibit 26 shows a cost comparison between all rail taconite shipment and the proposed project.

6.112 For the steel companies affected by the haulage changed, the effects would primarily result from the necessity of changing over from shiploading to rail car unloading facilities at the mill sites. Capital equipment expenditures for ship unloaders would be compromised and new capital expenditures for rail car dumpers would be required. To those companies which operate their own ore carriers, the impact would be substantially greater. Ships, with initial capital costs in the order of $20 million and daily operating costs of $3000 to $5000 would be without cargoes. To avert total loss of the investments placed in these vessels, the steel companies would be forced to seek charter cargoes or to sell the vessels to other Great Lakes carriers. The vessels affected by this alternative, based on 1977 expected tonnages, would be approximately 15 in number, with perhaps two in the new 59,000 ton class.

6.113 To the towns along the il haul routes, the increased rail traffic would be likely to me more community disruption from train noise, cross-road blockage, and rail maintenance activities. It could also mean some minor increases in local revenues from increased expenditures by railroad employees and from the railroad maintenance jobs made available to the local populace.

6.114 To the city of Superior, this alternative would most directly affect the already poor job market and the local air quality. Those employees currently involved in taconite handling at the Allouez docks and stockpile would face unemployment, unless they were adaptable to the new maintenance positions. New jobs projected to be part of the expanded facility would also be lost.

6.115 Air quality in Allouez and Superior would, on the other hand, be improved as the result of the removal of the primary particulate emission source, the taconite pellet stockpiles. This would in turn result in a more hospitable residential environment in Allouez. The Allouez Bay ecosystem would also become less disturbed as ship traffic diminished. The terrestrial ecosystem, presently planned for extinction to make way for the new stockpile lands, would be allowed to continue its ecological succession.

6.120 Extended Season and Year-Round Great Lakes Shipping. The possibility of an extended or a year-round shipping season on the Great Lakes continues to be considered and investigated through the Detroit office of the U.S. Army Corps of Engineers. Shipping into late January on the upper Lakes has been attempted the past several years. In conjunction with this extention, an air bubbler system has been installed at several sites in order to evaluate its ability in reducing the formation of ice and in minimizing the density strength of ice that does form. Duluth-Superior Harbor was the site of several of these experiments. U.S. Coast Guard ice breakers have also participated in the pilot program, working primarily in the narrow approaches to the Sault Ste. Marie Locks, the Straits of Mackinac, and the Detroit and St. Clair Rivers. Should the system become operational on a full scale basis, it is expected that several multi-purpose tugs with ice-breaking capabilities will be needed to assist the existing Great Lakes icebreaker system. Extension of the present shipping season from December 15 to February 1 is considered to be feasible for the near future. Further extensions of the season to a year-round operation may well rest on the feasibility of maintaining the lower lakes and the St. Lawrence Seaway through the winter. This possibility has yet to be researched.

6.121 Extending the shipping season should have largely positive impact. Economically, several parties stand to benefit from the reduction in vessel lay-up time; the ships owners and crews, and the employees at the loading and off-loading main terminal. To the ship owner, the extended season means more operations time and cargoes, smaller winter tie-up fees, and ultimately higher profits from his vessels. The ship crews and terminal employees would gain income from the increased work season and decreased time on unemployment rolls. Peripheral economic benefits would also be felt by those persons or companies which provide services to the Great Lake fleet.

6.122 The natural environment in Superior would also benefit from the extension in the shipping season. The taconite stockpiles, which upon completion of the terminal will cover some 139 acres of land, could be reduced substantially in size by this development. Two benefits would arise from this reduction: the land which has been cleared for stockpiling could be replanted with native tree species to provide increased buffering of the stockpiles from the Allouez community; at the same time, the reduction in the stockpiles would contribute to the lowering of the total quantity of pariculates in the local air mass. The buffer zone would also assist in reducing the amount of particulates reaching the surrounding residences.

6.123 Some negative effects would also come from extended-season or year-round shipping on the lakes and through the seaway. Those people who depend upon the frozen lake surface in the winter season for inter-island traffic movement over the lake ice in trucks and cars could be seriously affected. In addition, shore erosíon due to constant movement of ice blocks during the winter could be increased in certain areas.

6.130 Stabilization of Demand for Domestic Iron Ore. For the purposes of this discussion, "iron ore" will be taken to mean not only high-grade "red" ores which are not processed before shipment, but also low-grade ores such as taconite which must be crushed, concentrated and pelletized for economical shipment.

6.131 A stabilization in domestic iron ore consumption would essentially mean a curtailment of all new mining developments in our national iron ore ranges. The primary source of domestic iron ore, and therefore the most significantly affected, is the Mesabi Iron Range in northeastern Minnesota. This range supplies the raw ore for the taconite pellets which are currently shipped through Allouez terminal, and would supply the ore for the pellets to be shipped through the proposed terminal expansion.

6.132 The stabilization of our domestic iron ore consumption could subsequently affect national iron and steel production and ultimately the output of many U.S. manufacturers. The chief cause of such effects would be the major steel producers' decision to stabilize their iron and steel output at levels capable of being sustained by the available quantities of domestic iron ores. Should the steel producers on the other hand choose to continue to allow steel and iron production to increase, then new sources of raw materials would be needed. At the domestic level, scrap iron and steel (suitable replacements for raw ore in the blast furnaces) could be consumed. To obtain the quantities of scrap required by the steel producers, a substantial nationwide recycling program would probably have to be instituted. In addition, to meet the demand for scrap, sanitary landfills of major cities might have to be "mined" for the iron and steel they contain. Foreign sources of ore, particularly Australia and Canada, could be pursued by the steel producers. The cost of shipment and the cost of the ore itself could, however, be prohibitive to its ready use by the U.S. steel industry. Ports which would load and unload this ore would face particulate emissions problems similar in nature to those currently experienced by Superior, and in particular the residents of the Allouez community.

6.133 The local effects of this resource consumption policy change would be both positive and negative. Air quality in the community would not be subjected to any further emissions as the result of the extended stockpile area. The portion of the ecosystem to be displaced and disrupted by construction activities would be spared, at least for the present. Similarly, the segment of the aquatic ecosystem to be removed by dredging, support placement, and propellor wash would be spared.

6.134 On the negative side, the local economy, which was to receive 60 additional year-round jobs, would be affected. Support and service companies would also fail to receive income from the project. To the Burlington Northern corporation, major financial effects might occur as the result of its inability to ship the anticipated taconite.

6.200 Regional Alternatives.

6.201 Alternative Terminal Sites. Several important characteristics are necessary for a site to be suitable for use as a transshipment facility. Among them are natural, economic, and cultural environmental conditions which make the site tolerant of such a development:

1. To minimize adverse impact on habitat and water quality, adequate level topography with suitable foundation characteristics for the necessary stockpiling and unloading operation.

2. Adequate waterfront access for loading operations.

3. The potential for modification of the waterfront site to accomodate 50,000-ton vessels and transshipment activities.

4. Suitable harbor protection and harbor facilities for navigational access.

5. Existing rail service availability or potential for rail construction with minimal negative environmental impact.

6. The shortest practical rail haul to minimize transportation costs for the customer.

7. Land available for purchase.

6.202 Two other harbors on Lake Superior were investigated by Burlington Northern, Inc. A description of the sites and their associated impacts are presented below.

6.210 Ashland, and Washburn, Wisconsin. Because of their close proximity and similar physical characteristics, Ashland and Washburn will be discussed together in this report. The discussion will be divided into four categories: physical, environmental, socio-economic setting, and impacts of the proposed action.

6.220 Physical. Ashland and Bayfield counties include two of Wisconsin's physiographic regions, the Lake Superior lowland and the Northern Highland. Accordingly, topography varies from gently rolling lowlands near the lakeshore to steep hills in the interior of the counties. Numerous lakes characterize both counties. These lakes, together with the Lake Superior shorelands and the Apostle Islands, provide the basis of a growing recreation industry in the region.

6.221 The Lake Superior Lowland covers 25 percent of Bayfield County and 33 percent of Ashland County. The silt-to-heavy clay plain slopes 10 to 15 feet per mile towards the lake. Where river channels cross the lowland, the "V" shaped valleys evidence the ease with which the silts and clays are eroded. Marshes, stretches of sand beaches, and steep sandstone cliffs with caves and arches form most of the Lake Superior shoreline. Local relief on the lowland is as much as 300 feet.

6.222 The Northern Highland region is underlain by ancient bedrock and covered with a thin veneer of weathered glacial debris. Kettles and sizeable lakes add to the characteristic rugged scenery of the uplands where local relief reaches over 500 feet.

6.223 Topography near the Ashland harbor is characteristic of the Lake Superior Lowland. The relatively level topography upon which the city is built is separated from the lake shoreline by an escarpment ranging from a few feet to over 100 feet in height.

6.224 The city of Washburn is built near the lake shore at the base of low hills. Sandstone bluffs make up most of the shoreline along the Western edge of Chequamegon Bay. Bluffs with scattered boulder and sand beaches are the most common shore type. Along the northern city limits sand beaches are completely absent. Near the southern city limits is one small area of organic soils and marsh vegetation.

6.225 Northwestern Wisconsin has numerous lakes, streams, rivers, flowages, swamp and marsh lands. Ashland County has 71 named lakes; Bayfield County 319 (Natural Resources Council of State Agencies, 1973). Together the two counties have 39.78 square miles of lake surface excluding Lake Superior. The inland lakes are utilized heavily for recreation activities.

6.226 There are numerous rivers and streams in the region. Their gradients vary according to the geologic structure and the slope of the Lake Superior lowland. Within the larger rivers, such as the Bad River, discharge is sufficient to utilize the waters for some recreation activities, agriculture and domestic use. Exhibit 27 summarizes physical data on the region's streams.

6.227 Streams entering Lake Superior along the northern shore of the Bayfield Peninsula typically have poorly drained swamp and marshlands in their upper reaches. These wetlands may cover as much as 40 percent of the total drainage basin area. Lower portions of the basins have moderate to well developed drainage patterns.

6.228 Ground water in the region is a good source of water supply for domestic and industrial purposes. Normally, the water can be used without extensive treatment. The primary aquifers of the region are the glacial sands and gravels. These sands and gravels vary greatly in thickness and composition, accordingly, water yield varies. Some groundwater is also obtained from the sandstone bedrock.

6.229 Ashland and Bayfield counties have a cool, continental climate. Near the shores of Lake Superior and Chequamegon Bay the climate is moderated in the summer and transitional seasons.

6.230 Environmental. The vegetation that is found in Ashland and Bayfield is typical of the secondary stands of the original boreal forest cover. Prior to removal by settlers and loggers, the boreal forest was found on the Lake Superior shore and the tip of the Door County Peninsula on Lake Michigan.

6.231 The dominant tree cover near Lake Superior at the present time is balsam fir, white spruce, red and white pine, white cedar, white birch, trembling aspen, balsam poplar, red maple, white ash and mountain maple. The western shore of Chequamegon Bay has basswood, black oak and mountain ash.

6.232 Shrubs in the area include dogwood, sumac, arrowwood, blueberry, highbush cranberry, elderberry, wild grape, buttonbrush, snowberry and partridgeberry. Aquatic and riparian vegetation commonly found are willows, duck potato, water lilies, duck weed, coontail, wild celery, blue-green and green algae, a large number of sedges, and several grasses.

6.233 Mammals common in the area are deer, bear, beaver, snowshoe rabbit, bobcat, mink, otter, fisher, weasel, coyote, muskrat, moles, shrews, and mice. Avifauna are well distributed; the forests provide cover for breeding and nesting. Bald eagles, osprey, hawks, crows, ruffed and spruce grouse, puddle and diving ducks, gulls, terns, sandpipers, coots, loons, mergansers, kingfishers, and many songbirds add to the aesthetic attractions of the counties.

6.234 Chequamegon Bay and the adjacent wetlands serve as important breeding, nesting, and feeding areas for waterfowl, shorebirds, songbirds, reptiles, amphibians and fish. Some of these animals are important to the commercial and sport fisheries and other recreation oriented activities in the region.

6.235 Ashland harbor sediments have been sampled by the EPA, National Biocentric, Inc., and the University of Wisconsin at Superior. The data gathered generally confirms that the bottom sediments are polluted with respect to nitrogen, phosphorus, oil and grease, chemical oxygen demand, and several heavy metals (including lead and zinc).

6.240 Socio-Economic. Population statistics as shown in **Table 6-1 which illustrate quite clearly that the Ashland-Bayfield area** is in a steady population decline as it has been for some years. The decrease appears to be less significant now than a decade or two ago.

TABLE 6-1

Changes in the Total Population for Selected Northwestern Wisconsin Counties, 1940-1970

County	Total Population 1940	1950	1960	1970	% Change 1940-1950	1950-1960	1960-1970
Ashland	21,801	19,461	17,375	16,743	-10.7	-10.7	-3.6
Bayfield	15,827	13,760	11,910	11,683	-13.1	-13.4	-1.9
Iron	10,049	8,714	7,830	6,533	-13.3	-10.1	-16.6
Price	18,467	16,344	14,370	14,520	-11.4	-12.1	+1.0
Total Area	66,144	58,279	51,475	49,479	-11.8	-13.2	-3.9
Total State	3,137,587	3,434,575	3,951,777	4,417,731	+9.5	+15.1	+11.8

Source: U.S. Census of Population, 1940, 1950, 1960 & 1970

6.241 An analysis of population statistics from 1950, 1960 and 1970 reveals that while the population of the State of Wisconsin has increased over the period, Ashland County and the city of Ashland have decreased in population, as have corresponding figures for Bayfield County and Washburn. The Ashland-Washburn area has shown a population decline which is similar to that being experienced by numerous other northern Wisconsin communities.

6.242 Employment and unemployment statistics for the city of Ashland, the city of Washburn, Bad River Indian Reservation and Red Cliff Indian Reservation can be compared to the State of Wisconsin for selected periods from 1970 to October of 1974 in Exhibit 28.

6.243 It is of interest to note the consistently high rates over this period when comparing the city of Ashland to the State figures. The city has had a history of high unemployment, as have many northern Wisconsin cities. There are many contributing factors which may influence the economy of such an area. Among these are transportation of raw materials and finished products from place of origin to point of manufacture, and then, to place of consumption. Climate affects many industries; most notable are agriculture, construction and lake shipping. Unfavorable weather in winter and early spring affects the growing season. Cold temperatures affect construction work; frozen ground is difficult to work. When the harbors freeze over, shipping closes until spring. All of these affect the employment situation.

6.244 Washburn has unemployment rates which are, for the most part, below those of the state. The city of Washburn has a limited amount of employment opportunities to offer its resident labor force. While a substantial portion of the Washburn labor force is employed within Bayfield and Ashland counties, few of the jobs are located in Washburn itself. A number of professional people who reside in Washburn, work in Ashland in government jobs, schools, medical facilities and financial institutions.

6.245 The natural setting of Ashland and Bayfield counties, on the south shore of Lake Superior, affords visitors and residents a bountiful recreational resource. The wooded countryside provides unique opportunities for camping, hunting, hiking and picnicing. The plentiful water courses offer canoeing, and fishing. Lake Superior provides unlimited boating, deep sea fishing, water skiing, swimming and other water oriented activity. In the winter there is snowmobiling, downhill skiing, ice skating, cross country skiing, snowshoeing and other winter sports.

6.246 Perhaps the most significant recreation area is the newly created Apostle Islands National Lakeshore located in Ashland and Bayfield counties. This recreational area will introduce a considerable number of new visitations to the area. For a region already oriented toward outdoor recreation, this development adds stability and assures continued growth of the industry for years to come. High hopes are placed upon the Apostle Islands National Lakeshore to create the need for recreation-related service enterprises. The cities of Washburn and Ashland are in an excellent position to capture a portion of the economic impact resulting from the recreational use of the national lakeshore.

6.247 The zoning map (Exhibit 29) of Ashland, Wisconsin, shows the waterfront area of the city to be zoned for industrial uses. Highway commercial zoning occurs along US Highway 2 across the entire city. The central business district runs in a two block wide stretch along 2nd St. and 3rd St. between 17th Ave. west and 14th Ave. east. This covers approximately 37 square blocks in the heart of the city. Light industrial use occurs in several locations in the city (Refer to zoning map) two family and single family zoning occupy substantial portions of the remainder of the city's undeveloped area. Two family residential zoning serves as buffer in the central part of the city between industrial "A" and single family residential.

6.248 The land use map for Washburn (Exhibit 30) shows existing uses as of 1969. Percentage figures for use include the 31.5 percent of total area which has been developed. The remainder is undeveloped and is approximately 50 percent wooded. Of the developed land 21.6 percent is residential. This is the second most important use of land in the city and includes all types of residential land. Commercial lands are 2.1 percent of total developed land.

6.249 The largest single use of developed land in Washburn, occuping approximately 34 percent of the developed land, is dedicated to transportation right-of-ways.

6.250 Impacts of Proposed Project. The evaluation of the environmental impact of the project at the Ashland and Washburn alternative sites is predicated on the following assumptions:

a. Construction impact on aquatic and terrestrial ecosystems, as well as habitat quality, will be identical to those at the Superior location.

b. Construction impact on socio-economic areas including air quality, community disruptions, economics, employment, and noise levels will be identical to those at the Superior location.

c. Operation impact on the aquatic ecosystem, and terrestrial flora and fauna will be identical to those at the Superior location.

d. Operation impact on socio-economic areas including economics, and employment, will be identical to those at the Superior location.

6.251 These assumptions are reasonable and justifiable. Construction of the components of such a transshipment facility including stockpile area, conveyor system, and dock facilities requires potential impact causing activities such as the clearing of land, movement of heavy equipment, construction in a navigable waterway, and employment of laborers. These activities, by their very nature, are sources of impact which affect the physical and socio-economic environment. Similarly, operation of the facility requires movement of ore boats, the employment of workers, and generation of a certain amount of wind blown dust. These affects are inherent to such a facility and will be transferred to any alternative site.

6.252 The level to which construction of the facility would affect aesthetics in Ashland depends to some extent on the site selected for the facility. However, there are no large parcels of land available for locating the facility at the shoreline. Both zoning and present land use requires that the large stockpile area be set back from the shoreline. Such a set back requires construction of the same conveyor system as is present at Superior. Further, the bluff on which the city of Ashland is built affords a panoramic view of the entire harbor. Thus, the construction of the dock facility, conveyor system, and perhaps even the stockpiles would be within full view. The contrast would be striking.

6.253 Washburn has no heavy industrial facilities along the shoreline at the present. Construction of a taconite transshipment facility along the shoreline would contrast with existing aesthetics even more tnan an Ashland site. Like Ashland, the shoreline is open to full view from much of the town. Construction activities would contrast sharply with the present open space, second growth timber, and attractive shoreline of Chequamegon Bay.

6.254 As has been already pointed out, the location of the transshipment facility at either Ashland and Washburn would probably be within view of much of the city. Thus the dark colored stockpiles, the long conveyor system, and the shiploading facility would contrast with present aesthetics. The size of the facility, as viewed from the bluff at Ashland or the hillslope at Washburn, would make the facility the dominant visual feature on the landscape. The facility would contrast sharply with the summer greens and blues that now dominate. For an area becoming increasingly dependent upon recreation activities, the impact will be significantly adverse at both sites.

6.255 Land use along the shoreline of Chequamegon Bay in Ashland is primarily open space, recreation, and industrial. Most of the open space is zoned for industrial uses. However, the parcels are small; even the presently planned industrial park is too small for the proposed facility. In addition, the existing ore dock is not satisfactory for the proposed loading system. A new shiploading system would have to be built.

So, while Ashland has committed land and expenditures to its harbor activities, the level of operation is so small that the taconite transshipment facility would be inconsistent with existing shoreline uses. This is true because of the size of the transshipment facility and because of the lack of existing heavy industrial activities in the area.

6.256 Washburn's harbor is even smaller and less frequently used than Ashland's. Shoreline land use is primarily open space at the present. Location of the facility in or near Washburn would be even more inconsistent with existing land use plans and zoning laws than at Ashland. The aesthetic and air quality impacts resulting from transshipment of taconite would also reduce the value of shoreline lands for commercial recreation development as most lands are now zoned. Substantial adverse impacts on land use would result from locating the facility in Washburn.

6.257 Locating the facility at either site would require overhaul and upgrading of Burlington Northern's rail link between Superior and the site. A study conducted by Burlington Northern indicates that the cost of upgrading the 67 miles of track between Superior and Ashland is estimated at $175,000 per mile of track.

6.300 <u>Local Alternative Sites</u>. Several locations in the Duluth-Superior Harbor were considered by Burlington Northern. The environmental setting and many of the impacts would be the same for these sites as for the proposed location. Therefore only the reasons for rejection as provided by Burlington Northern, Inc. will be presented.

6.310 <u>Former Northern Pacific Ore Dock at Allouez</u>. This site was considered and rejected for the following reasons:

1. The area available at the dock site was not adequate for total storage requirements.

2. The conveyor construction from the car unloading facility to the dock facility be routed through additional residential area.

3. There are no train unloading possibilities adjacent to the site requiring that unloading of trains be located adjacent to the existing taconite facility in the yard.

4. The high cost of repairing and remodeling the dock for use as surge storage for shiploaders.

5. It would require acquisition of land for the storage area.

6. It would require considerable dredging for ship berthing adjacent to the proposed dock.

6.320 Existing Taconite Facility. Expansion of the existing taconite facility was considered and rejected for the following reasons:

1. The existing facility would not be capable of handling the total throughput even with major revisions to equipment and capacities.

2. Present operation would preclude any revisions to the existing facility, as it must remain in operation to handle existing pellet productions.

3. The existing storage area cannot be expanded to handle storage requirements of total throughput.

4. The existing ore dock cannot accommodate loading of the large lake vessels being constructed.

6.330 Existing Coal Dock and Adjacent Land East of Existing Burlington Northern Docks. This site was considered as one of the prime locations for the proposed taconite transshipment facility, as it was the least expensive to construct of all the sites investigated. It was not considered as the final site for the following reasons:

1. The facility would be located on and adjacent to a residential area.

2. The train unloading loop track would require the displacement of many homes encircled by the loop track.

3. The storage area would require filling of an existing slip.

4. The unit train movement would be through a residential area and across roads and highways.

5. It would require acquisition of land for the loop track and the storage area.

6.340 Duluth Port Authority Property - St. Louis Bay. This site was considered and rejected because of the following reasons:

1. The area available was not adequate to handle the storage requirement of the proposed throughput.

2. Unit train operation would create difficulties through the Duluth yards.

3. Manuevering problems into this site with the larger lake vessels would occur.

6.400 No Project Alternative. The decision to abandon the proposed taconite facility expansion at Allouez could have far-reaching local and regional effects. Because of commitments by several steel companies to build and operate new taconite processing plants, taconite pellet tonnages will increase. These additional tonnages will require transshipment; if it is not available at Allouez, some other Lake Superior port will provide it.

6.401 As discussed previously in the Site Alternatives section of this chapter, the impact of the proposed terminal would largely be transported along with the pellets to whatever new site was chosen. Thus, while Allouez's air quality may not become any worse, neither will its economic future brighten. This is the chief trade-off associated with this alternative.

6.402 In the event of no action, additional consideration might also be given to the proposed site of the terminal. Not only might air and water pollution increase in the vicinity of the new site, but also existing land use might be displaced or adversely affected. Waterfront lands may be filled, dredged, or leveled. The local aquatic community might be significantly altered by dredging, filling, and new or increased shipping activities. These phenomena, which may moderately or insignificantly affect the man-disturbed environment at Allouez, could conceivably cause significant harm to the environmental quality of a more pristine site.

7.000 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE NATURAL ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY.

7.001 In providing taconite for the short-term steel needs of the country, long-term cross-regional commitments would give economic impetus to several communities (Hibbing, Superior, etc.), with limited environmental degradation as the resulting trade-off. Efforts to control environmental impact, particularly air pollution, necessitate expenditure of other resources to maintain standards of environmental quality. This section discusses briefly the national, regional, and local aspects of these trade-offs.

7.002 The continued extraction and consumption of iron ore by the nation's industry and population further depletes a non-renewable, essential resource. The project is founded on increased extraction and consumption of the nation's only large-scale domestic source of iron ore to provide for the short-range needs of the country. Development and consumption of domestic sources of iron ore contribute to our short-term economic stability by reducing our reliance on foreign ore. But the immediate mining of taconite is at the expense of existing land and habitat values in Minnesota, and possibly more essential uses of the iron ore if the resource were reserved for future generations.

7.003 In the total picture, the project is connected with only a small part of all the mining activity in the Mesabi Range. Nevertheless, continued or expanded mining results in a diminished environmental quality in the Mesabi Iron Range, in Superior, Wisconsin, and at the nation's steel region. The loss is due to the disturbance of land productivity, resulting water resource contamination, and added air pollution.

7.004 When natural vegetative cover is removed for surface mining operations, a great loss of wildlife habitat results: the repercussions of erosion spreads the problem through other portions of the drainage basin; this makes natural reclaimation difficult. Without proper soil and stable slopes, grasses and shrubs cannot reintroduce themselves.

7.005 The addition of sediments and toxic mine wastes to surface and ground waters is common to surface mining regions. This pollution has serious effects on aquatic life, recreation, and even water supplies.

7.006 All of the environmental problems associated with surface mining are perpetuated by the socio-economic structure of this nation. The mining operations provide jobs for people in the phases of extraction, transportation, and processing of minerals. In turn, jobs are created in the associated fields of manufacturing and construction. This nation, whose economic base is industrial development depends on an endless chain of resource consumption and development. Thus, the influx of additional iron ore to the Industrial Northeast allows for increased industrial development, continued urban growth and further resource demand.

7.007 Duluth-Superior, in turn, would be making a longer-term commitment to the marine commerce industry through the development of this project. Expansion of the transshipment facility is consistent with the recent and projected uses of the Duluth-Superior harbors. Furthermore, the commitment of more land to industrial commerce within the harbor area would also tend to reinforce those uses in a concentrated industrial/marine terminal zone. This additional commercial activity would offset the loss of the disturbed, partially developed waterfront land as marginal open space. It does, however, further exclude the possibility of alternate uses of the harbor and shore.

7.008 As has been pointed out, the Duluth-Superior area suffers from serious unemployment. While the facility would not solve the entire problem, it does represent a significant contribution to alleviating the region's difficulties. Expansion of the work force along with the total economic impact serves as the primary counter balance for the short-term and long-term negative environmental impacts.

8.000 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

8.100 Economic Commitments. The construction of the terminal facility would consume, over a 2½-year period, approximately $40 million. This money would go for major equipment purchases, new materials for facility construction, and for laborer's wages.

8.101 Yearly operations would consume approximately $2.7 million, divided between payrolls, electrical power, fuel, taxes, and maintenance of the site and equipment.

8.200 On the Mesabi Range in Minnesota, land will be directly committed to mining the ore. At the project site there would be a permanent loss of approximately 100 acres of terrestrial habitat where the new stockpile would be located.

8.300 Materials and Energy for Construction and Operation. The construction, operation and environmental control of the project would consume or divert energy and materials. Materials consumed for facility construction would most prominently include:

Concrete - 5,000 cubic yards
Structural Steel - 2,000 tons
Plywood - 25 tons

8.301 To maintain the operation of the facilities, the following resources would be committed*

Electrical Energy	39,420,000 KVAH/year
Human Work Hours	Approximately 124,800 man hours/year
Diesel Fuel	68,000 gallons/year
Water	21.8 million gallons/year

* Based on 17.9 mlt throughput

9.000 COORDINATION

9.001 An important part in the preparation of this environmental assessment report was coordination with Federal, State, and local interests including:

U.S. Environmental Protection Agency
Minnesota Pollution Control Agency
Minnesota Department of Natural Resources
The State Historical Society of Wisconsin
The City Governments of Superior and Duluth

9.002 In addition, a number of public meetings were held at which the proposed facility was discussed in detail.

9.003 Copies of the environmental assessment report will be sent to the previously mentioned agencies in addition to members of the public who were prominent in the public meetings and also to all those requesting further information.

10.000 CONCLUSIONS

10.001 This report presents a clear and fair appraisal of the environmental impacts of the proposed expansion and improvement of the Burlington Northern, Inc., taconite transshipment facility.

10.002 The following environmental controls incorporated into the design of the project would serve to mitigate the project's adverse effects: inclosure of the transfer belt systems to reduce dust emissions by over 50 percent to quantities below the National Ambient Air Quality secondary standards of 60 micrograms/m^3 (annual geometric means); the disposal of all dredged material in such a way as to prevent the return of potential contaminants to the ecosystem; the use of runoff water from the taconite stockpiles as irrigation water for the proposed greenbelt areas and as dust suppression spray.

10.003 The depressed economy of the Duluth-Superior area would benefit by the creation of approximately 60 new permanent jobs and the resultant addition of about $1.4 million in annual wages to the community, as well as the economic impact of constructing the $40 million facility.

10.004 Burlington Northern, Inc., will comply with requests by the Wisconsin Department of Natural Resources, the U.S. Fish and Wildlife Service and the Environmental Protection Agency to utilize a dredge material disposal site which would have the least adverse environmental impact.

10.005 An archaeological investigation of the areas that would be affected by the project is required, and Burlington Northern has offered assurance that such an investigation will be conducted when climatological conditions permit.

10.006 Throughout the planning of this project, the opportunity for public input has been prevalent. Two public meetings held by Burlington Northern, Inc., and a public hearing by the Wisconsin Department of Natural Resources have demonstrated that a number of people in the affected area want the new facility and the improvements to the old facility to be implemented as soon as possible. The widespread distribution of the Public Notice, issued by the Corps to provide all interests with a description of the project, and the subsequent lack of negative response to that notice, further indicates that the project is not controversial.

10.007 I conclude that the proposed taconite transshipment facility would not have a significant adverse effect on the quality of the human environment. Accordingly, an environmental impact statement will not be prepared.

Max W. Noah

MAX W. NOAH
Colonel, Corps of Engineers
District Engineer

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TECHNICAL

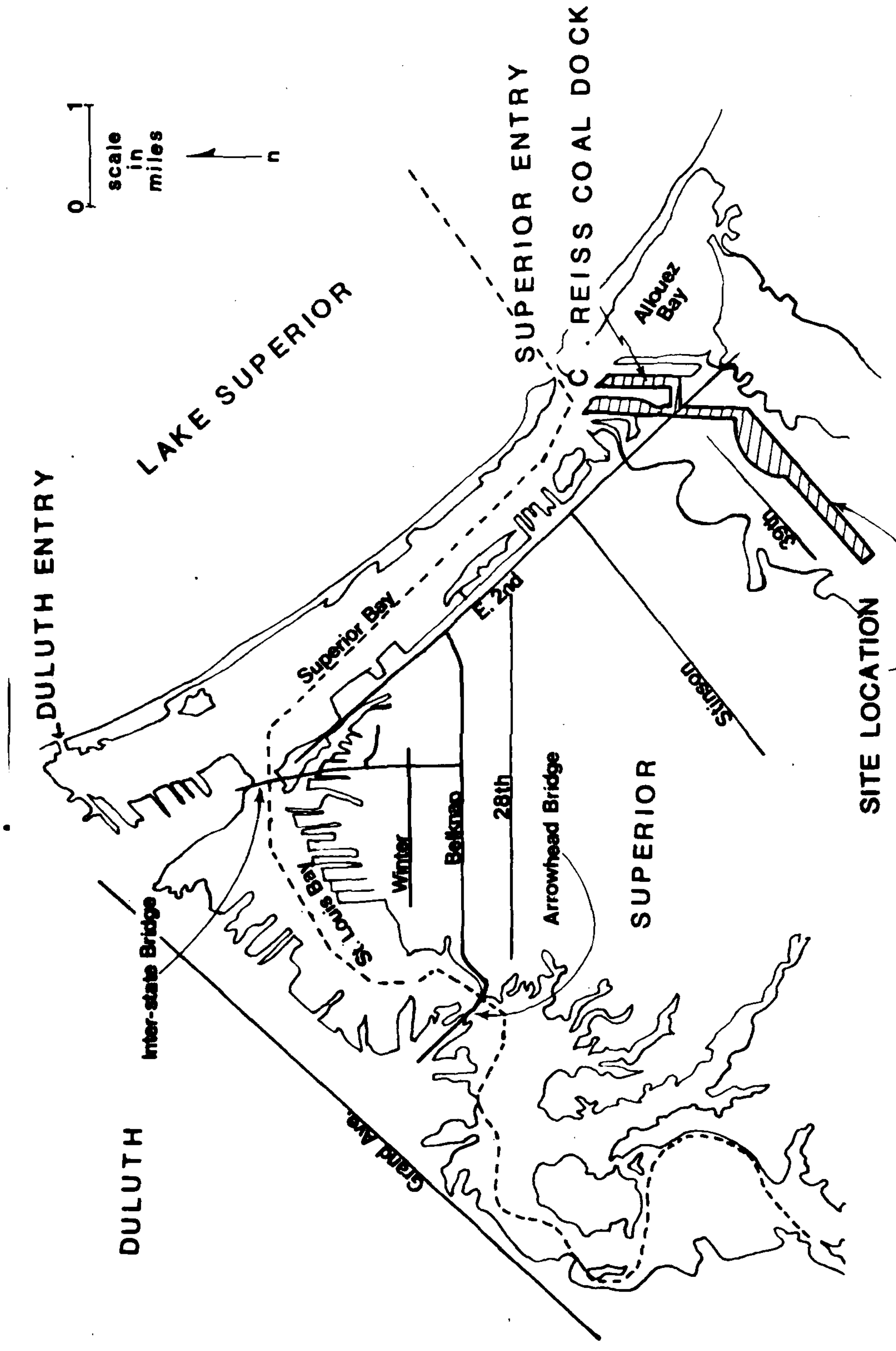
APPENDIX

ST. PAUL DISTRICT, CORPS OF ENGINEERS
DEPARTMENT OF THE ARMY

ENVIRONMENTAL ASSESSMENT REPORT
BURLINGTON NORTHERN
TACONITE TRANSSHIPMENT FACILITY
DULUTH-SUPERIOR HARBOR
SUPERIOR, WISCONSIN

TECHNICAL APPENDIX

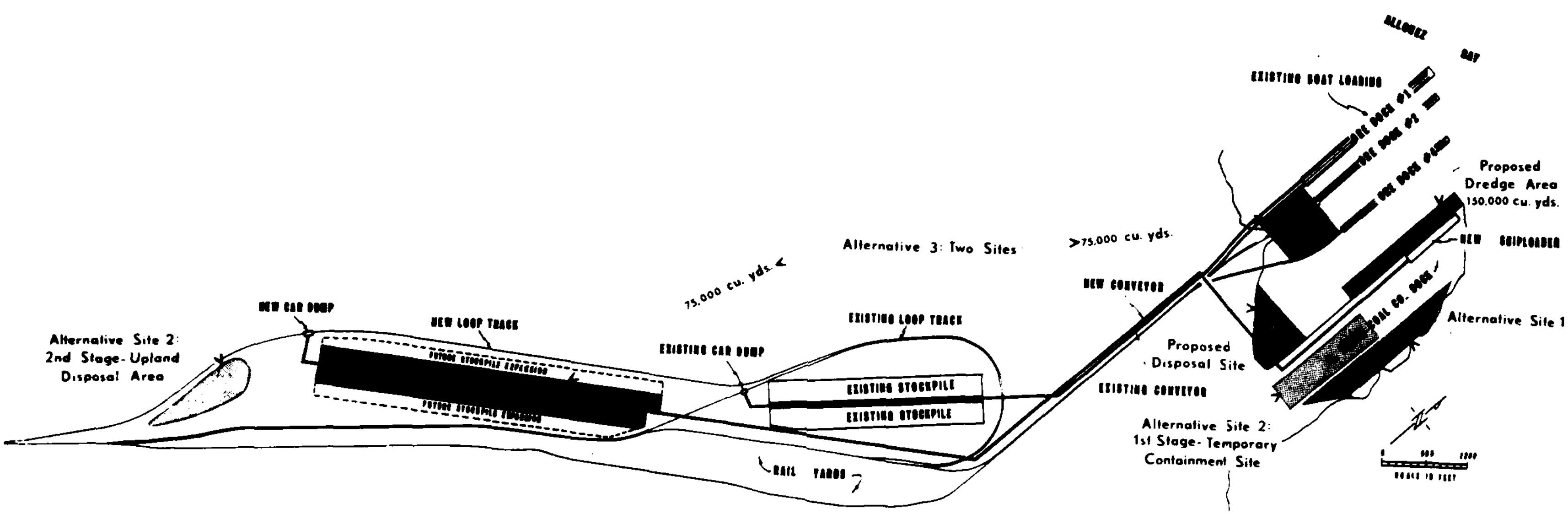
TABLE OF EXHIBITS



Regional Location Map

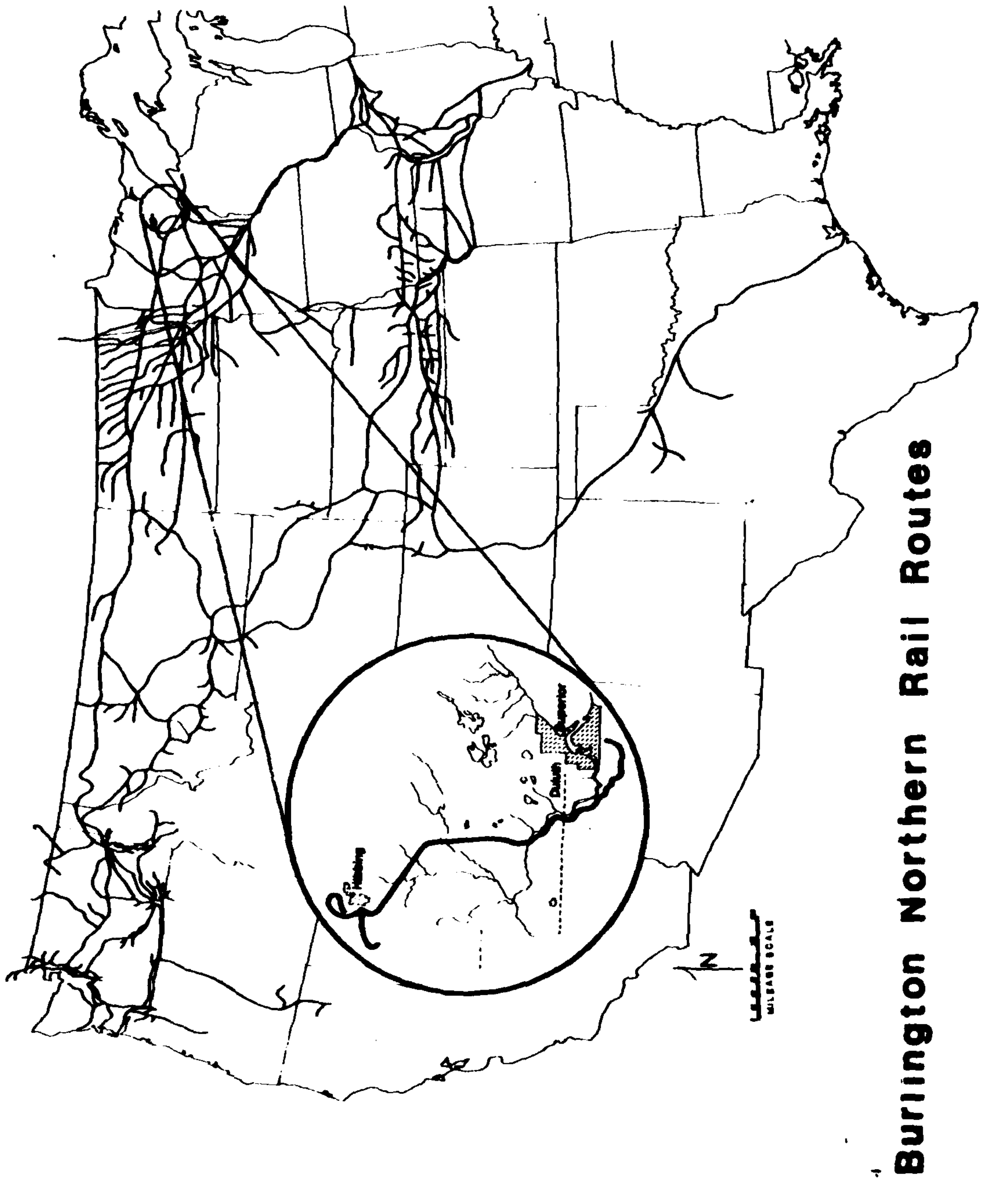
Exhibit 1

Site Layout - Taconite Transshipment Facility



Disposal Alternative Sites

Exhibit 2



Burlington Northern Rail Routes

Exhibit 3

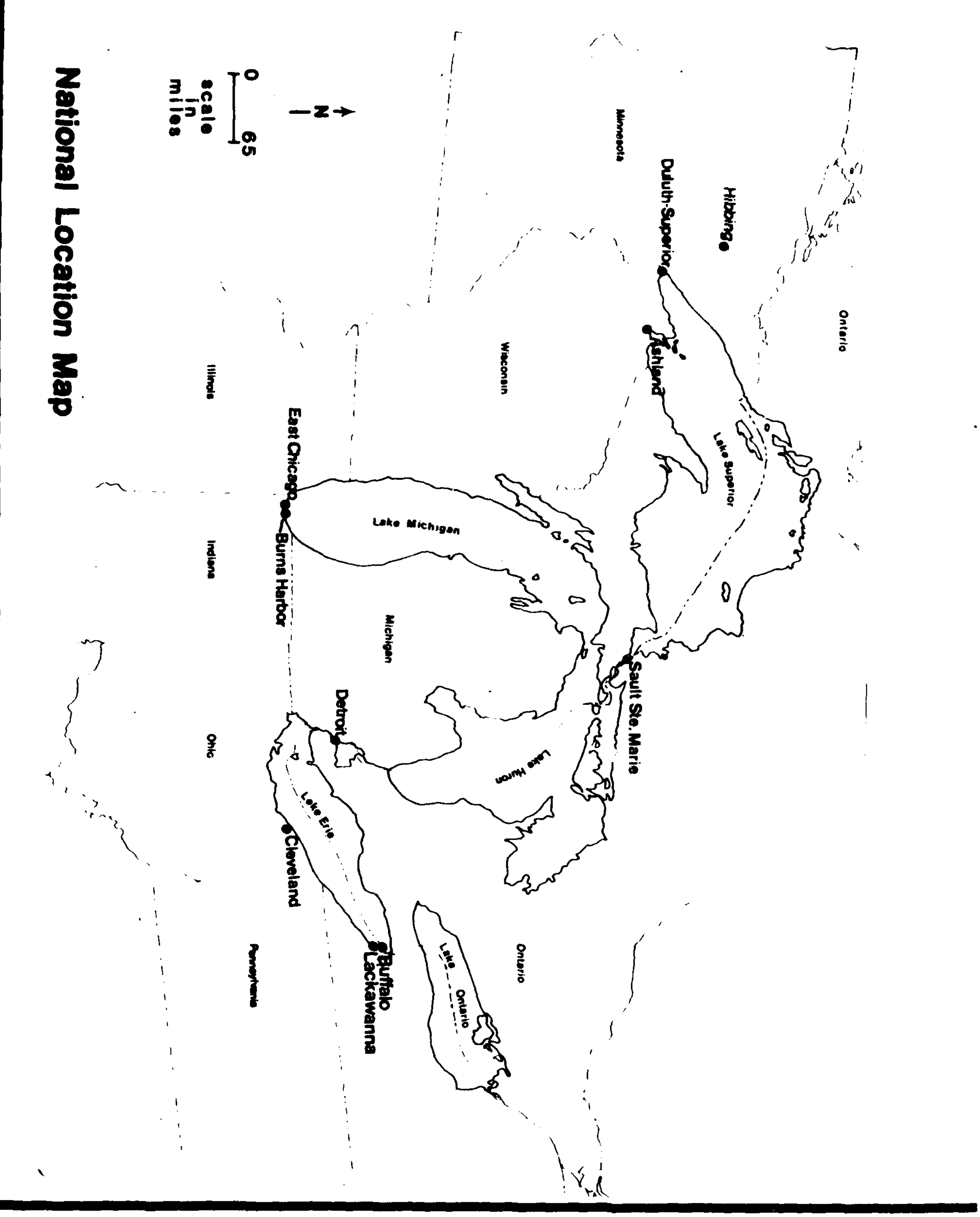
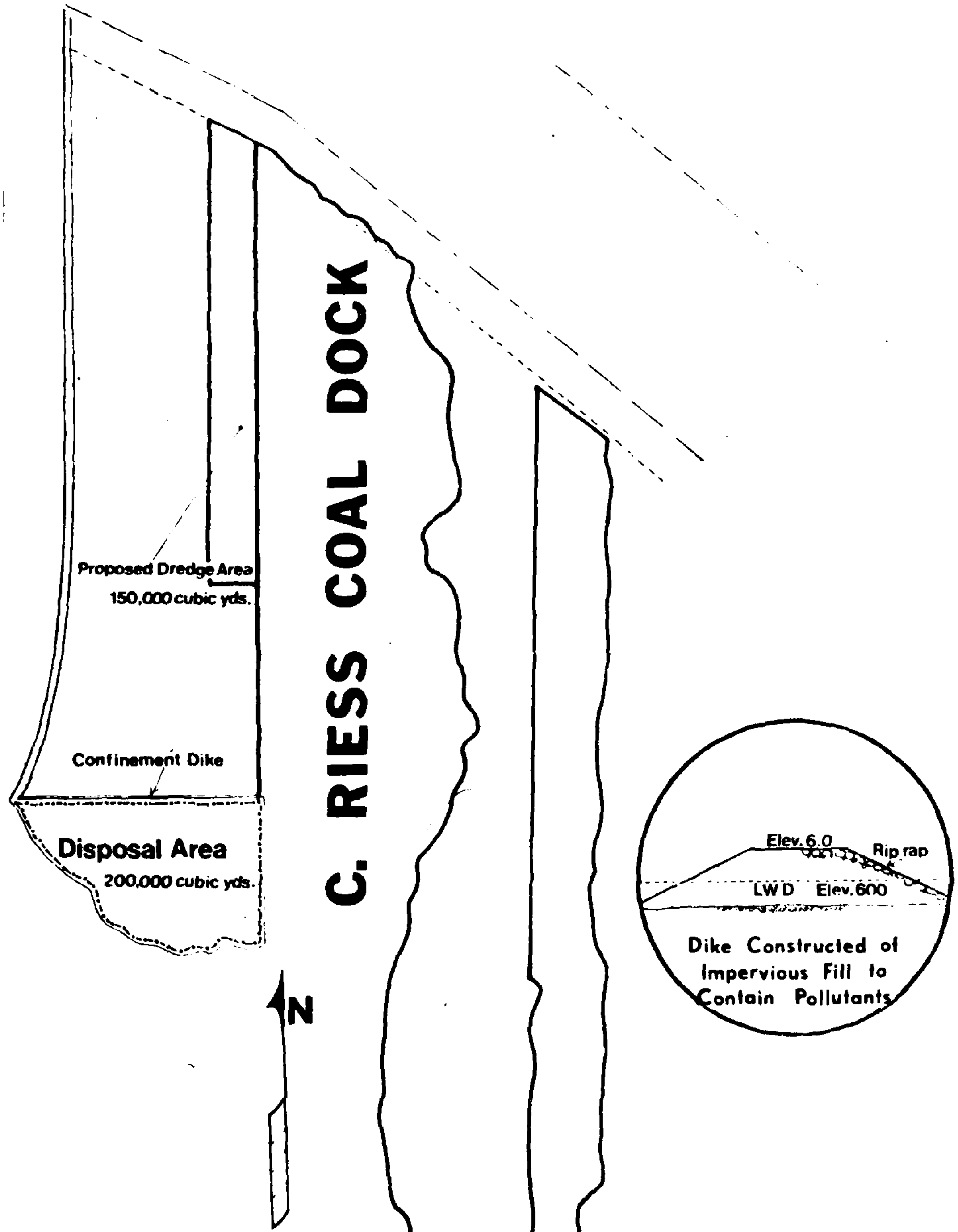
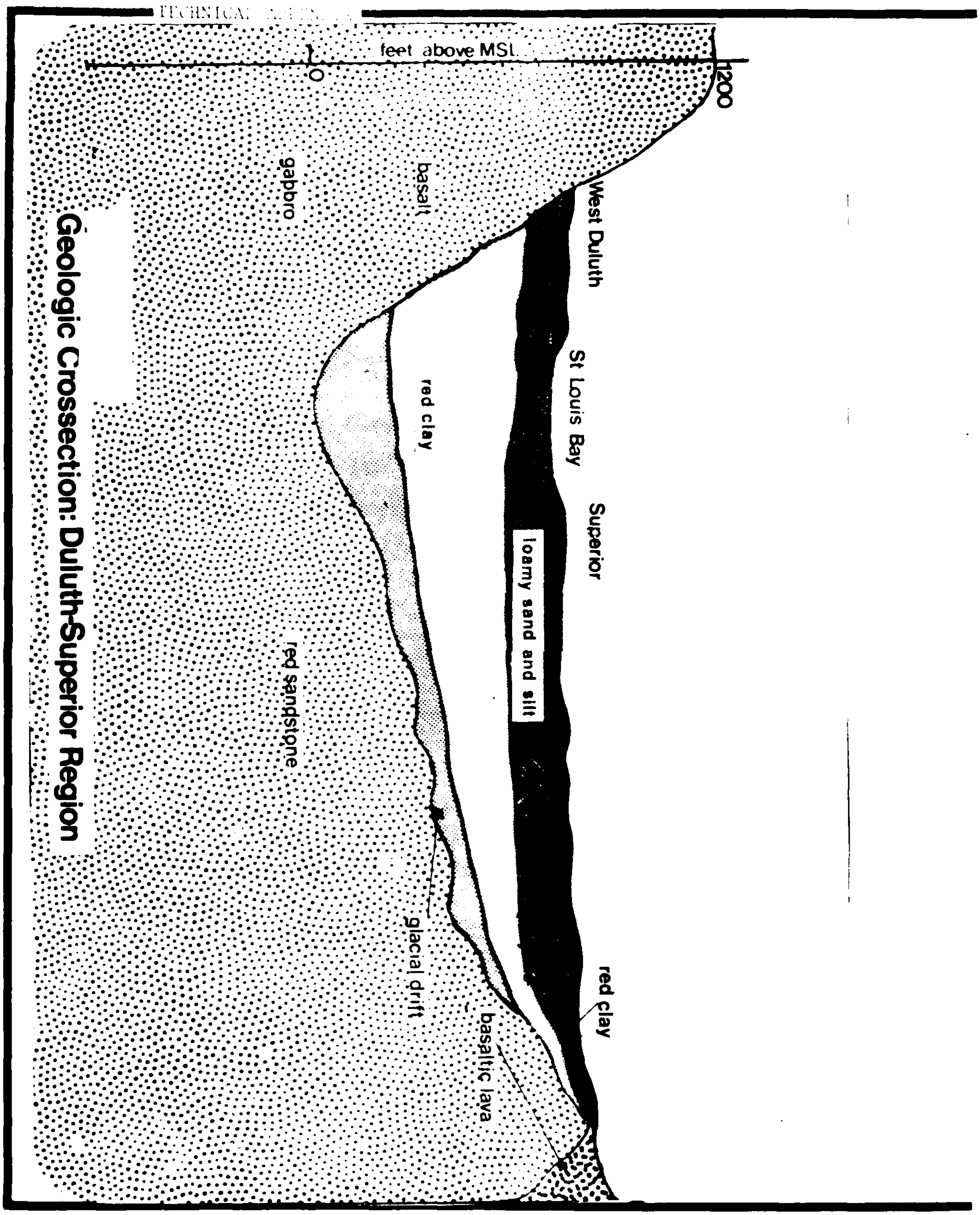

National Location Map
N
0
65
scale
in
miles
Minnesota
Hibbing
Duluth-Superior
Ashland
Ontario
Lake Superior
Wisconsin
Illinois
East Chicago
Lake Michigan
Burns Harbor
Indiana
Michigan
Sault Ste. Marie
Lake Huron
Detroit
Ohio
Lake Erie
Cleveland
Pennsylvania
Buffalo
Lackawanna
Lake Ontario
Ontario

Exhibit 4



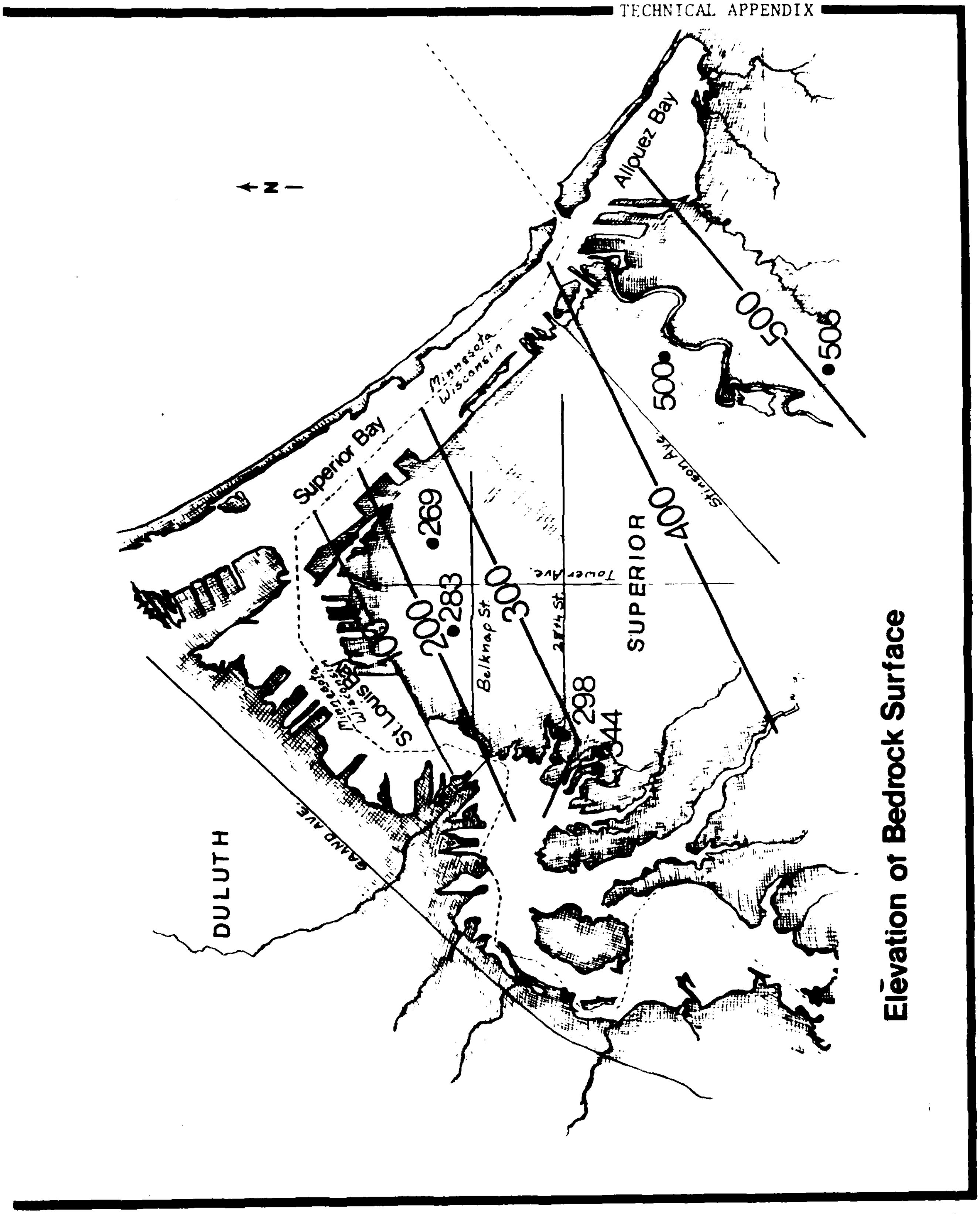
Proposed Dredge Material Disposal Site

Exhibit 5



Geologic Crossection: Duluth-Superior Region

Exhibit 6



Elevation of Bedrock Surface

Exhibit 7

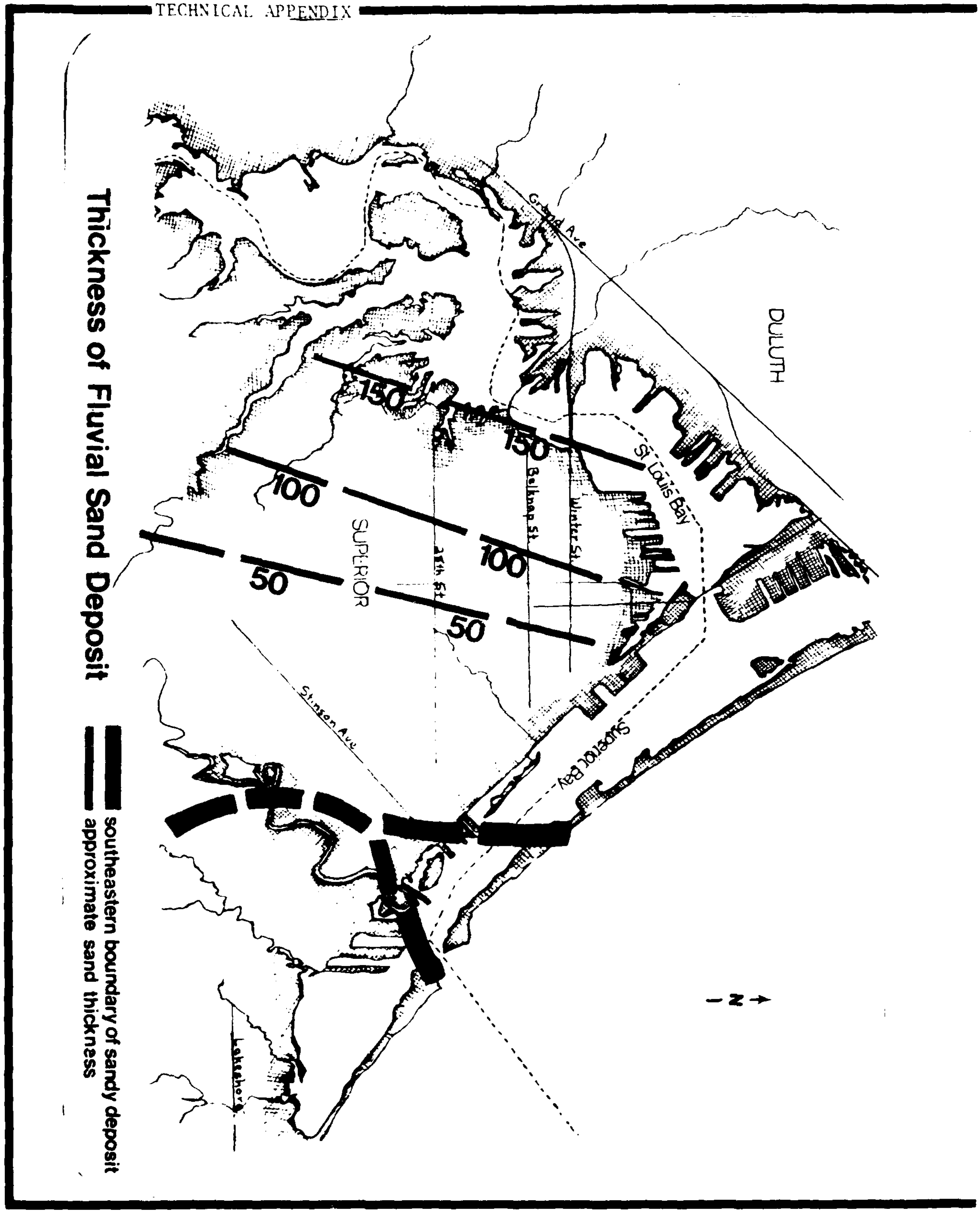
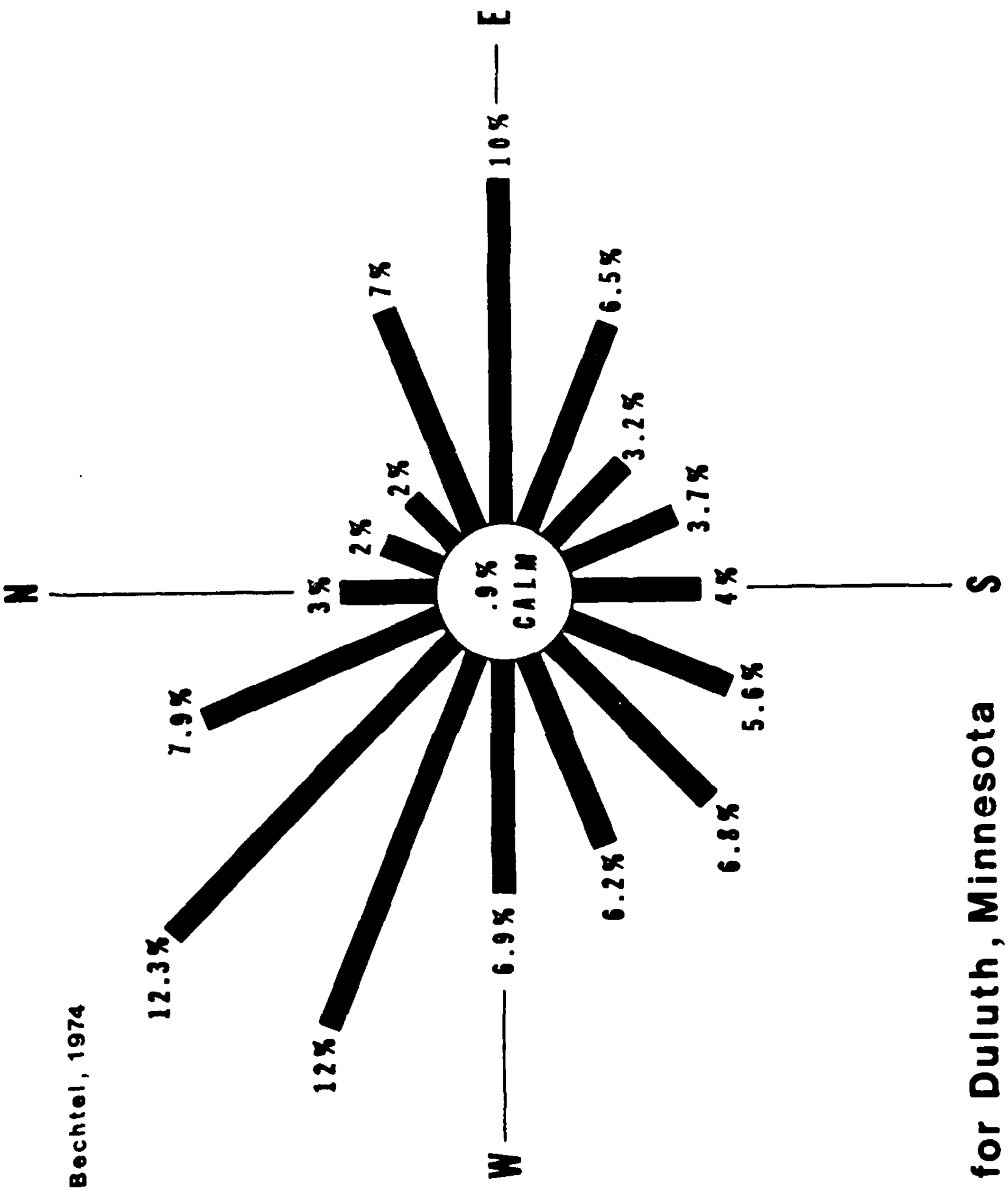

Thickness of Fluvial Sand Deposit
southeastern boundary of sandy deposit
approximate sand thickness
DULUTH
SUPERIOR
St Louis Bay
Superior Bay
Grand Ave
Belknap St
Winter St
Stinson Ave
150
150
100
100
50
50
N

Exhibit 8



Source: American Bechtel, 1974

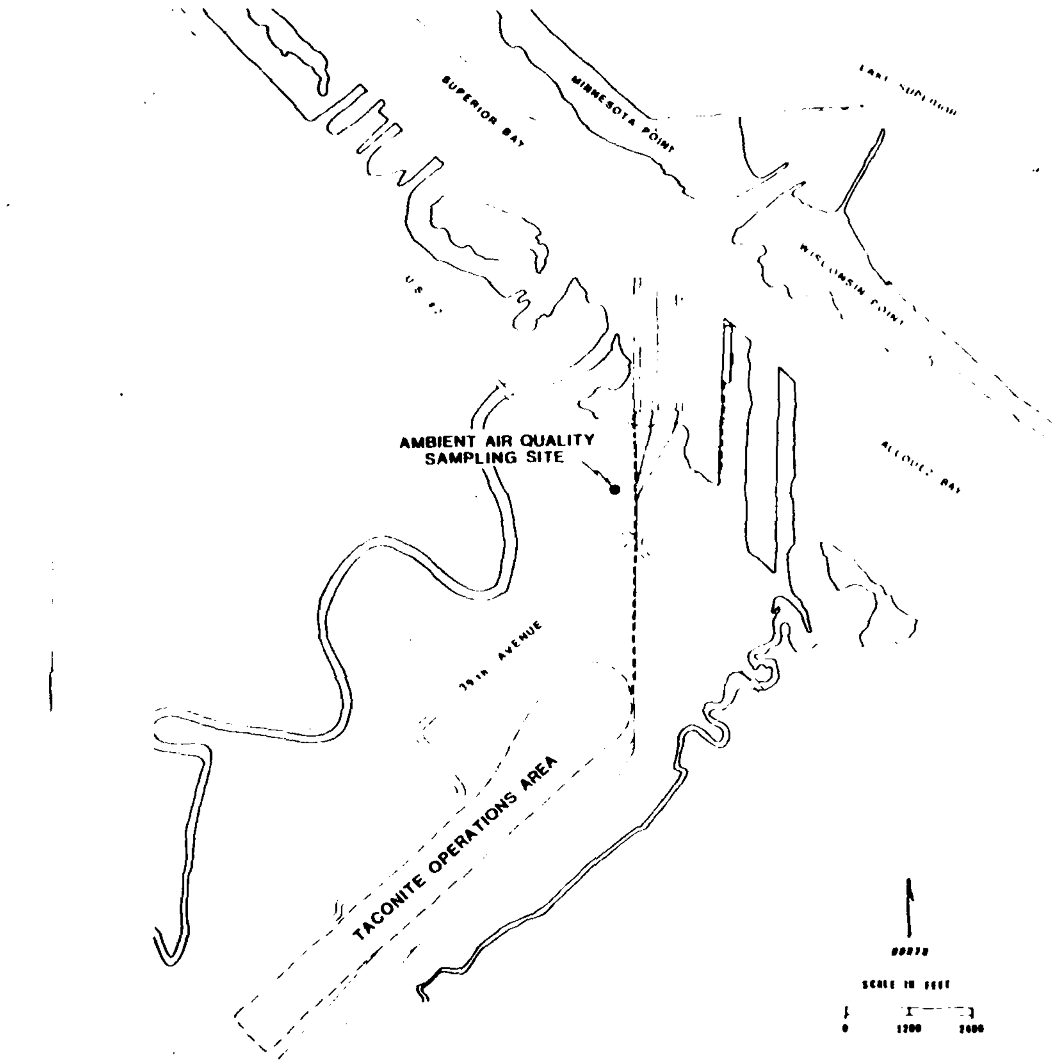
Wind Rose for Duluth, Minnesota

Exhibit 9

Air Quality Data Summary
Northwest Wisconsin - Duluth, Minnesota Interstate AQCR

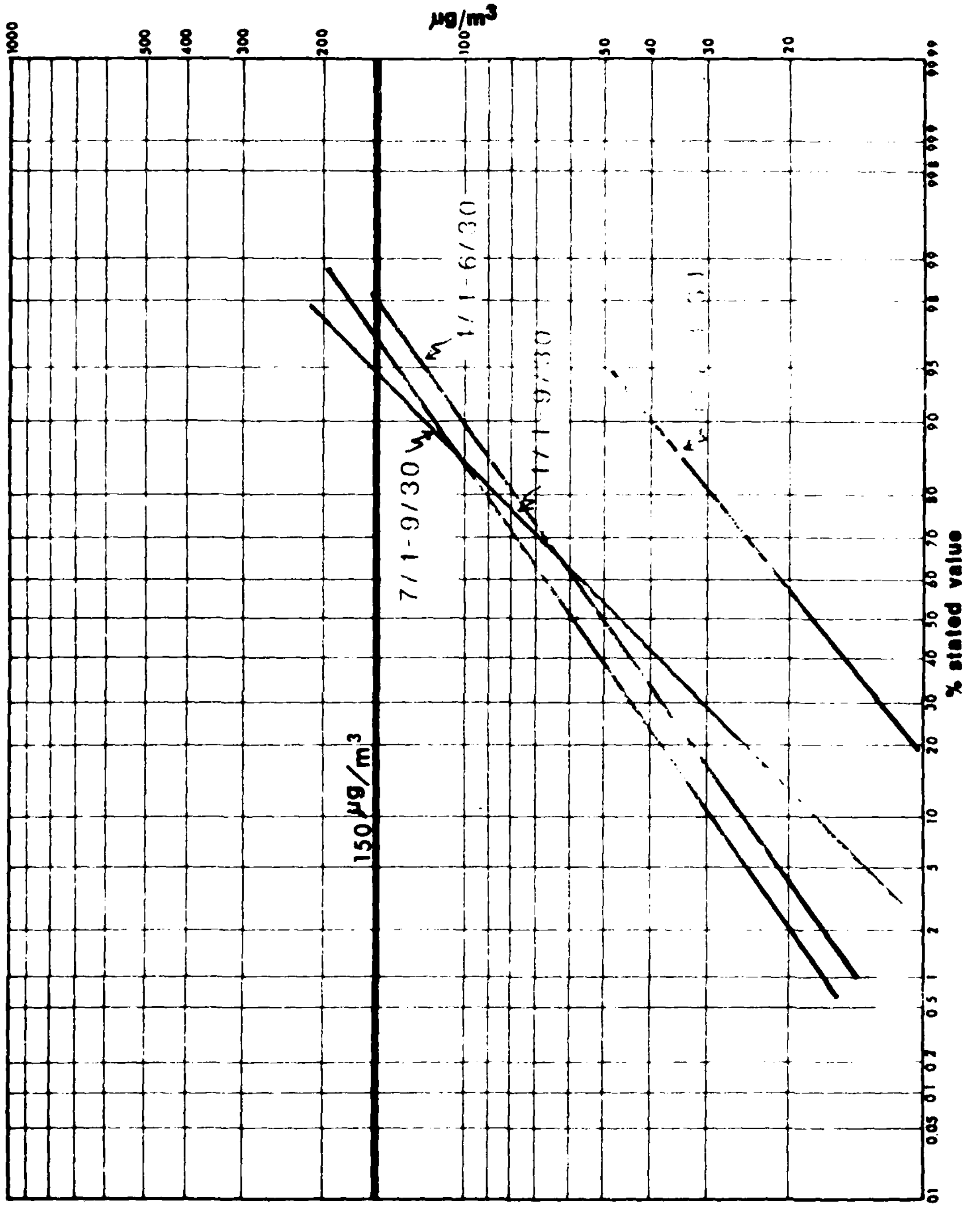
County City Site	Pollutant	Samp. Int. (Mos.)	Start Date	End Date	No. of Samp.	Max. 1-Hour	Max. 3-Hour	Max. 8-Hour	Max. 24-Hour	Min. 24-Hour	Annual Arith. Mean	Std. Dev.	Annual Geo. Mean	Std. Geo. Dev.	Unit Code
Douglas															
Superior															
3718 East 1st St.															
	Sus. Particulate	3	1-73	3-73	29				48.00	2.30	28.77	11.57	17.33	1.95	01
		3	4-73	6-73	41				151.20	15.00	56.75	34.51	50.31	1.76	
		3	7-73	9-73	38				192.30	16.20	69.27	41.01	58.11	1.84	
	Copper	3	4-73	6-73	6				0.11	0.04	0.07	0.03	0.07	1.49	01
		3	7-73	9-73	17				0.70	0.03	0.07	0.04	0.06	1.59	
		4	4-73	9-73	23				0.20	0.03	0.07	0.04	0.06	1.55	
	Iron	3	4-73	6-73	6				11.39	0.57	6.76	3.93	4.90	3.05	01
		3	7-73	9-73	16				37.39	0.35	7.22	9.17	4.38	2.49	
		6	4-73	9-73	22				37.39	0.57	7.10	7.99	4.52	2.72	
	Lead	3	4-73	6-73	6				0.55	0.01	0.14	0.20	0.07	3.63	01
		3	7-73	9-73	17				1.10	0.10	0.26	0.29	0.18	2.14	
		6	4-73	9-73	23				1.10	0.01	0.23	0.27	0.14	2.70	
	Manganese	3	7-73	9-73	17				0.35	0.03	0.16	0.11	0.13	2.04	01
	Zinc	2	4-73	5-73	5				0.05	0.05	0.05	0.00	0.05	1.00	01
	Sulphur Dioxide	2	2-73	3-73	5				5.00	1.00	3.18	2.01	2.50	2.32	01
		3	4-73	6-73	24				8.00	1.00	1.84	1.82	1.39	1.95	
		3	7-73	9-73	17				17.70	1.00	7.76	5.53	5.04	3.03	
Barstow Hall															
O. W. - Superior															
	Sus. Particulate	3	1-73	3-73	31				115.10	3.10	36.35	20.14	31.46	1.83	01
		3	4-73	6-73	41				142.70	16.80	50.34	27.90	44.29	1.66	
		3	7-73	9-73	37				132.70	11.80	44.87	24.33	39.62	1.66	
	Sulphur Dioxide	3	1-73	3-73	39	45.10	0.00	0.00	17.40	1.00	9.80	9.29	6.08	3.02	01
		1	4-73	4-73	8				4.50	1.00	2.21	1.63	1.72	2.11	
		4	1-73	4-73	47	45.10	0.00	0.00	17.40	1.00	8.51	8.95	4.90	3.16	
WDSN Radio Bldg.															
1706 Belknap															
	Sus. Particulate	3	1-73	3-73	18				156.10	34.70	89.40	44.29	78.89	1.69	01
		3	4-73	6-73	42				199.70	12.20	97.34	36.83	89.07	1.61	
		3	7-73	9-73	39				162.70	29.10	85.88	30.75	80.00	1.49	
	Sulphur Dioxide	2	2-73	3-73	10				36.50	1.00	11.24	11.17	5.94	3.90	01
		3	4-73	6-73	22				6.60	1.00	1.59	1.60	1.26	1.79	
		3	7-73	9-73	19				19.40	1.00	10.09	5.66	7.50	2.65	

Exhibit 10



Air Quality Sampling Site

Exhibit 11



JANUARY-SEPTEMBER, 1973

Suspended Particulate - Frequency Distribution

Location - 3718 E. 1st Street

Exhibit 12

Burlington Northern
Water Chemistry - Procedures

Parameter	Detection Limit	Reference
Fecal Coliform	0 colonies/100 ml	Std. Methods, 407C
Total Coliform	0 colonies/100 ml	Std. Methods, 408A
Biochemical Oxygen Demand	0.1 mg/l	Std. Methods, 219
Chemical Oxygen Demand	0.1 mg/l	Std. Methods, 220
Nitrogen, Ammonia	0.010 mg/l as N	EPA[2], p141
Nitrogen, Organic	0.010 mg/l as N	Std. Methods, 135
Nitrogen, Nitrite	2 µg/l as N	EPA, p. 195
Nitrogen, Nitrate	.010mg/l as N	Std. Methods, 213C
Phosphorus, Total	1 µg/l as P	EPA, p. 235
Phosphorus, Ortho	1 µg/l as P	EPA, p. 235
Suspended Solids	1 mg/l	EPA, p. 278
pH	0.1 pH unit	Std. Methods, 144A
Antimony	0.005 mg/l	Perkin-Elmer[3]
Arsenic (Total)	0.001 mg/l	Perkin-Elmer
Cadmium	0.1 µg/l	Perkin-Elmer
Calcium	0.1 mg/l	Std. Methods, 129
Copper	0.1 µg/l	Perkin-Elmer
Iron	0.005 mg/l	Perkin-Elmer
Lead	0.5 µg/l	Perkin-Elmer
Magnesium	0.1 mg/l	Std. Methods, 129
Manganese	0.5 µg/l	Perkin-Elmer
Mercury	0.2 µg/l	EPA; p. 121
Potassium	0.01 mg/l	Std. Methods; 129
Selenium	0.001 mg/l	Perkin-Elmer
Sodium	0.01 mg/l	Std. Methods; 129
Zinc	0.1 µg/l	Perkin-Elmer
Chlorides	0.5 mg/l	Std. Methods; 112B
Organic Carbon (Total)	1 mg/l	Std. Methods; 138A
Sulfates	0.1 mg/l as SO_4	Std. Methods; 156C
Hardness (Total)	1 mg/l as $CaCO_3$	Std. Methods; 122B
Alkalinity	1 mg/l as $CaCO_3$	Std. Methods; 102
Solids, Total	1 mg/l	EPA; p. 280
Solids, Total Dissolved	1 mg/l	EPA; p. 275

Introduction

Water chemistry samples were collected from the Duluth-Superior Harbor during February 1974. The samples were collected from locations in the harbor to determine the water quality.

Methods

Water samples were collected from 12 stations in the Duluth-Superior Harbor. Holes were cut through the ice which was approximately 2 feet thick and cleared. Chemically cleaned polyethylene bottles were then lowered into the hole and filled. After all samples had been collected, they were returned to the Limnetics, Inc., Laboratory with analyses beginning within eight hours.

Exhibit 13

Water Quality Parameters Measured In Duluth-Superior Harbor

PARAMETERS	STATIONS 1	2	3	6	7	8	9	10	12	13	14	15
calcium mg/l	18.0	17.0	18.0	16.0	16.5	17.0	32.0	18.0	15.5	19.5	18.5	33.0
magnesium mg/l	6.4	6.3	6.5	5.2	5.3	5.9	11.1	5.8	4.6	6.5	6.1	16.5
sodium mg/l	11.2	11.5	11.6	8.2	9.0	10.6	6.1	9.2	6.2	6.8	8.8	11.5
potassium mg/l	1.3	1.4	1.4	1.2	1.25	1.45	1.4	1.5	1.1	2.7	1.6	3.85
iron mg/l	0.83	0.82	1.20	0.70	0.77	0.86	0.98	0.88	0.57	2.3	0.94	3.50
manganese mg/l	0.33	0.14	0.16	0.12	0.25	0.16	0.07	0.16	0.10	0.07	0.15	0.70
cadmium mg/l	0.0006	0.0005	0.0002	0.0002	0.0002	0.0006	0.0002	0.0008	0.0002	0.0002	0.0002	0.0005
zinc mg/l	0.015	0.007	0.025	0.015	0.015	0.020	0.004	0.020	0.008	0.015	0.010	0.020
lead mg/l	0.005	0.004	0.005	0.010	0.004	0.002	0.001	0.006	0.004	0.011	0.002	0.005
mercury mg/l	0.0008	0.0026	0.0030	0.0007	0.0010	0.0033	0.0010	0.0037	<0.0007	0.0005	0.0006	0.0016
copper mg/l	0.005	<0.005	0.006	0.005	<0.005	0.005	0.005	0.005	0.005	0.006	0.005	0.008
arsenic mg/l	<0.001	0.001	0.001	0.001	0.001	<0.001	0.001	<0.001	0.001	0.001	0.001	0.001
total phos. phor. mg/l	.045	.050	.070	.100	.100	.155	.040	.135	.095	.110	.125	.190
suspended solids mg/l	5.0	6.0	22.0	4.0	3.0	4.0	10.0	9.0	2.0	7.0	5.0	30.0
ortho-phospha. mg/l	.005	.005	.005	.035	.045	.055	.010	.055	.040	.055	.065	.060
nitrite mg/l	.012	.013	.010	.010	.009	.017	.007	.015	.010	.008	.012	.018
nitrate mg/l	.03	.05	.08	.12	.10	.05	.36	.12	.15	.48	.15	.13
organic N mg/l	.76	.60	.64	.89	.51	.68	.17	.68	.47	.72	.68	.68
sulfate mg/l	17.0	17.0	16.0	13.0	14.0	16.0	16.0	14.0	11.0	12.0	14.0	13.0
chloride mg/l	12.9	12.9	12.9	8.2	9.4	11.8	3.5	8.2	5.9	8.2	8.2	8.2
pH units	7.79	7.68	7.70	7.77	7.74	7.69	8.12	7.81	7.80	7.83	7.82	8.10
alkalinity mg/l	47.6	45.9	44.2	42.5	44.2	47.6	98.6	51.0	42.5	52.7	49.3	131.0
hardness mg/l	75.8	72.3	74.0	65.4	67.2	70.6	131.0	77.5	63.7	80.9	77.5	198.0
oil and grease mg/l	6.0	10.0	2.0	3.0	8.0	7.0	19.0	4.0	<1.0	10.0	1.0	2.0

Exhibit 13

Table B-2 (continued)

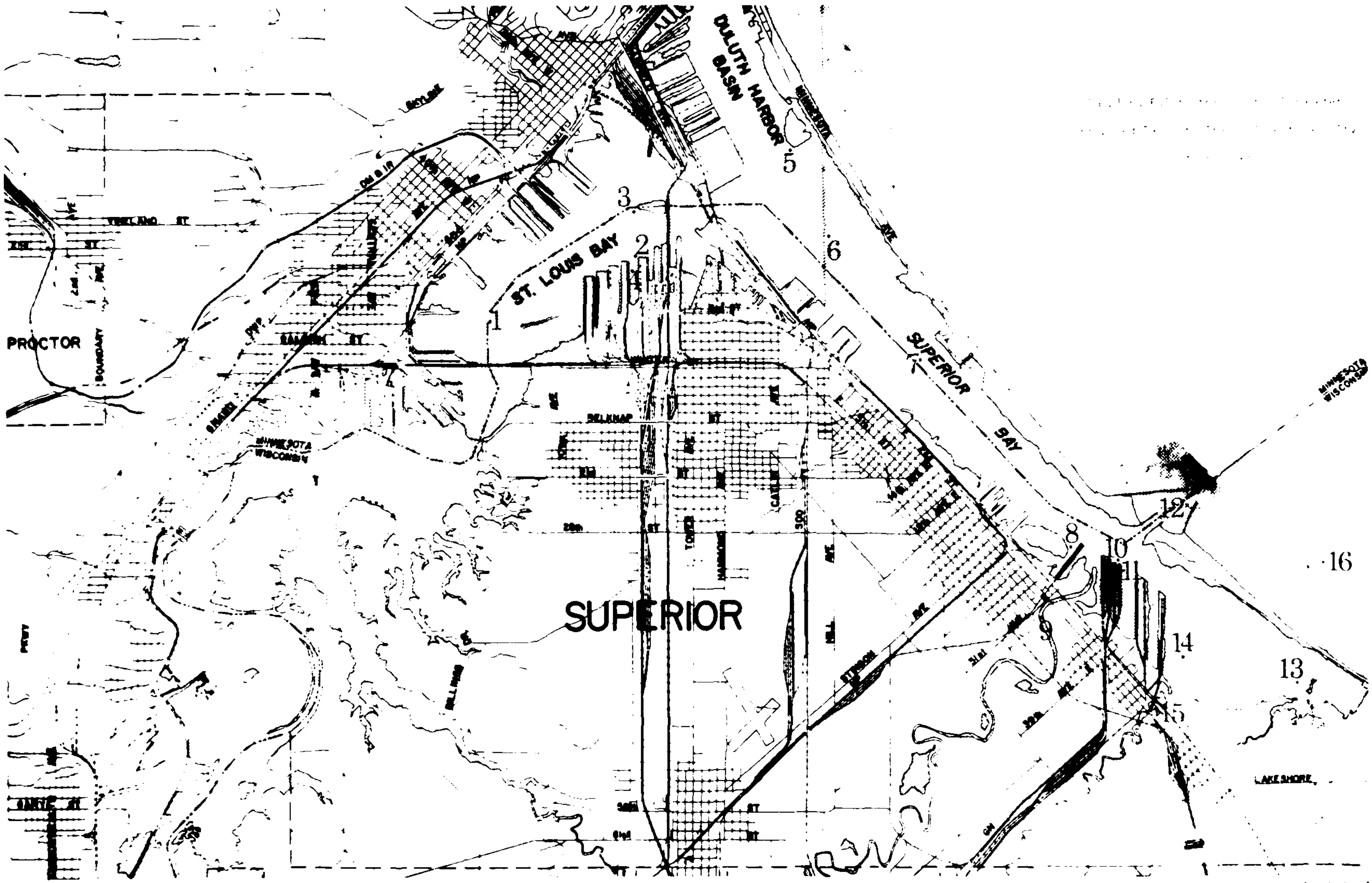
PARAMETERS	1	2	3	6	7	8	9	10	12	13	14	15
NH_3 mg/l	.13	.17	.17	.13	.17	.17	< 0.03	.21	.13	< .03	< .03	< .03
COD mg/l	33.0	62.0	62.0	50.0	6.0	69.0	21.0	19.0	4.0	50.0	50.0	46.0
TOC mg/l	32.0	35.0	35.0	26.0	29.0	31.0	4.0	24.0	20.0	22.0	28.0	17.0
total solids mg/l	137.0	180.0	174.0	187.0	219.0	226.0	177.0	131.0	176.0	191.0	137.0	324.0
dissolved solids mg/l	106.0	101.0	98.0	81.0	81.0	113.0	129.0	94.0	77.0	103.0	109.0	184.0
BOD	3.6	3.8	4.2	3.3	2.9	4.8	1.1	3.3	2.3	2.1	2.6	1.2
fecal coli-form/ 100 ml	11.0	37.0	7.0	12.0	2.0	21.0	500.0	19.0	42.0	<2.0	52.0	630.0
total coli-form/ 100 ml	100.0	305.0	300.0	200.0	400.0	900.0	11,000.00	400.0	400.0	<100.0	<100.0	2600.0
selenium mg/l	0.10	0.12	0.08	0.09	0.09	0.11	0.08	0.08	0.10	0.13	0.10	0.09
antimony mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Water Quality Parameters Measured on the Nemadji River

By the Western Lake Superior Sanitary District

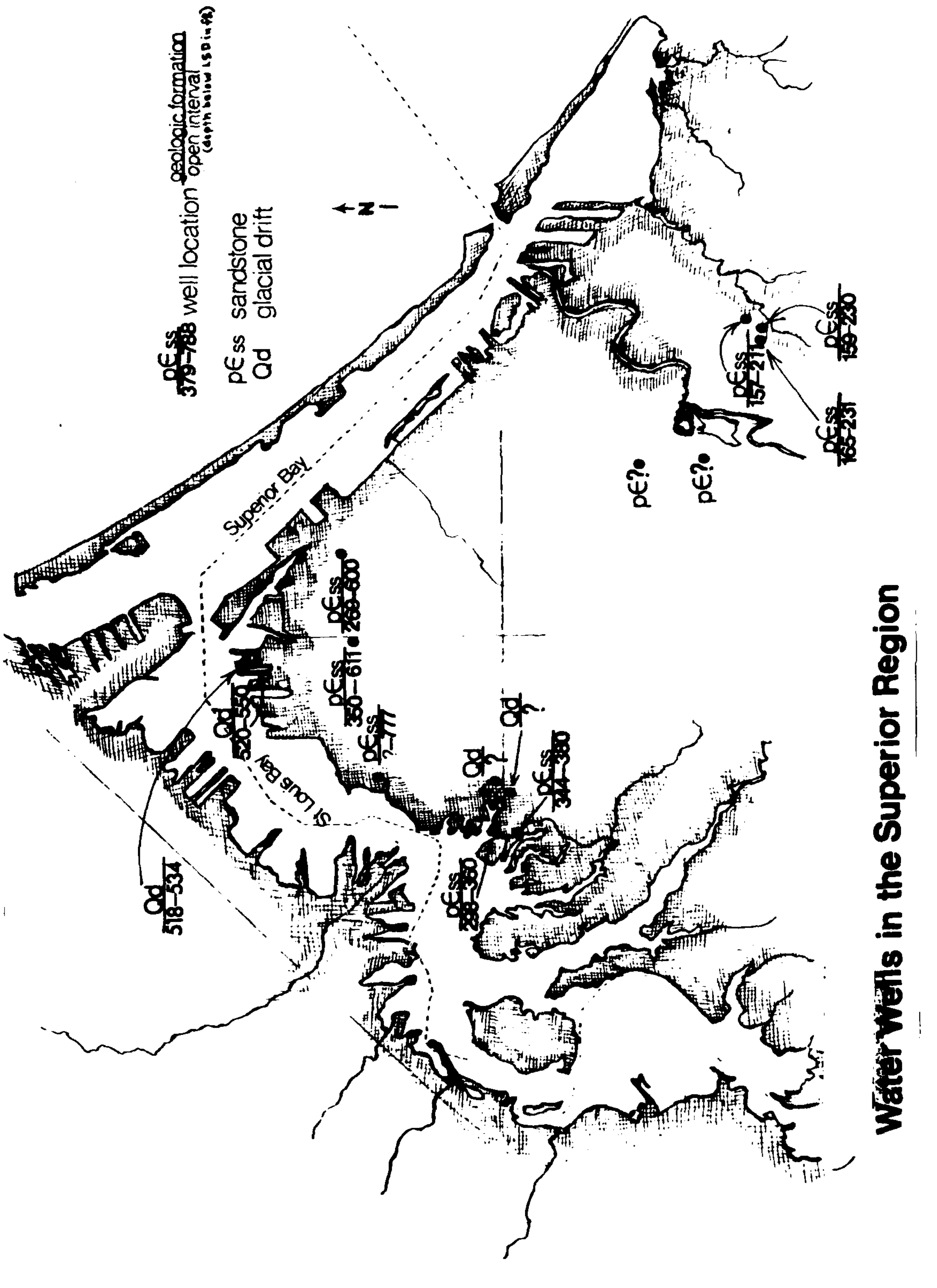
Parameters	Dates 11/5/73	11/12/73
Depth (ft.)	6	6
Temp (^{o}F)	35	34
D.O (mg/L)	11.2	11.9
pH	7.45	7.20
Turb (FTU)	14.0	18.0
Color (CU)	120	120
BOD_5 (mg/L)	3.2	2.6
Total Coli	9000	3700
(MPN/100 ml) Fecal Coli	280	<10
(MPN(100 ml) Fecal Strep	150	60
(MPN(100 ml) Total Phos. -P (mg/L)	0.025	0.020
TKN (mg/L)	0.8	0.9
NH_3-N (mg/L)	-	0.01
Total Solids (mg/L)	265	211
TDS (mg/L)	254.6	204.6

Exhibit 13



A17

Exhibit 15



Water Wells in the Superior Region

Exhibit 14

Mammals sighted, trapped or otherwise recognized as being inhabitants of the Taconite Stockpile - Belt system, Superior, Wisconsin. January - February, 1974.

Common Name	Scientific Name
Masked Shrew	*Sorex cinereus*
Shorttail Shrew	*Blarina brevicauda*
Eastern Cottontail	*Sylvilagus floridanus*
Weasel	*Mustela spp*
Norway Rat	*Rattus norvegicus*
Red Fox	*Vulpes fulva*
Varying Hare	*Lepus americanus*
Meadow Vole	*Microtus pennsylvanicus*
Raccoon	*Procyon lotor*
Opposum	*Didelphis marsupialis*
Bear	*Euarctos sp*
White Tail Deer	*Odocoileus virgianus*
Mink	*Mustela vison*
Red Squirrel	*Tamiasciurus hudsonicus*

MAJOR INDUSTRIES

Duluth

Major Employers	Business
Duluth, Mesabi Iron Range Railway	Railroad
Jeno's, Inc.	Grozen Food
Superwood Corp.	Hardboard
Diamond Tool Co.	Tools
Clyde Iron Works	Machinery
Harcourt, Brace, Jovanovich, Pub.	Magazine Publisher
Zalk Josephs Company	Steel Bldg. Products
Elliott Packing Company	Meats
Universal Atlas Cement, U.S. Steel	Cement
North Shore Manufacturing	Clothing

Superior

Major Employers	
Burlington Northern Railway	Transportation
Fraser Shipyards, Inc.	Shipbuilding and Repairs
Lakehead Constructors, Inc.	Construction
Soo Line Railway	Transportation
Duluth Scientific, Inc.	Electronic Equipment
Murphy Oil Corporation	Oil Refinery
Superior Fiber Products, Inc.	Hardboard Manufacturing
Great Northern Elevators	Grain Storage
Superior Water, Light and Power Company	Utilities
Cutler-LaLiberte-McDougall Corp.	Lime and Road Stone
Lakehead Pipe Line Company, Inc	Oil Storage and Shipping
Lake Superior Terminal Ry.	Railway
Peevey Flour Mills	Flour and Feed
Superior-Lidgerwood-Mundy Corp.	Shipping Equipment
Farmers Union Grain Terminal Co.	Grain Storage
Jeno's Inc. (Superior)	Pizza Crust

Exhibit 16

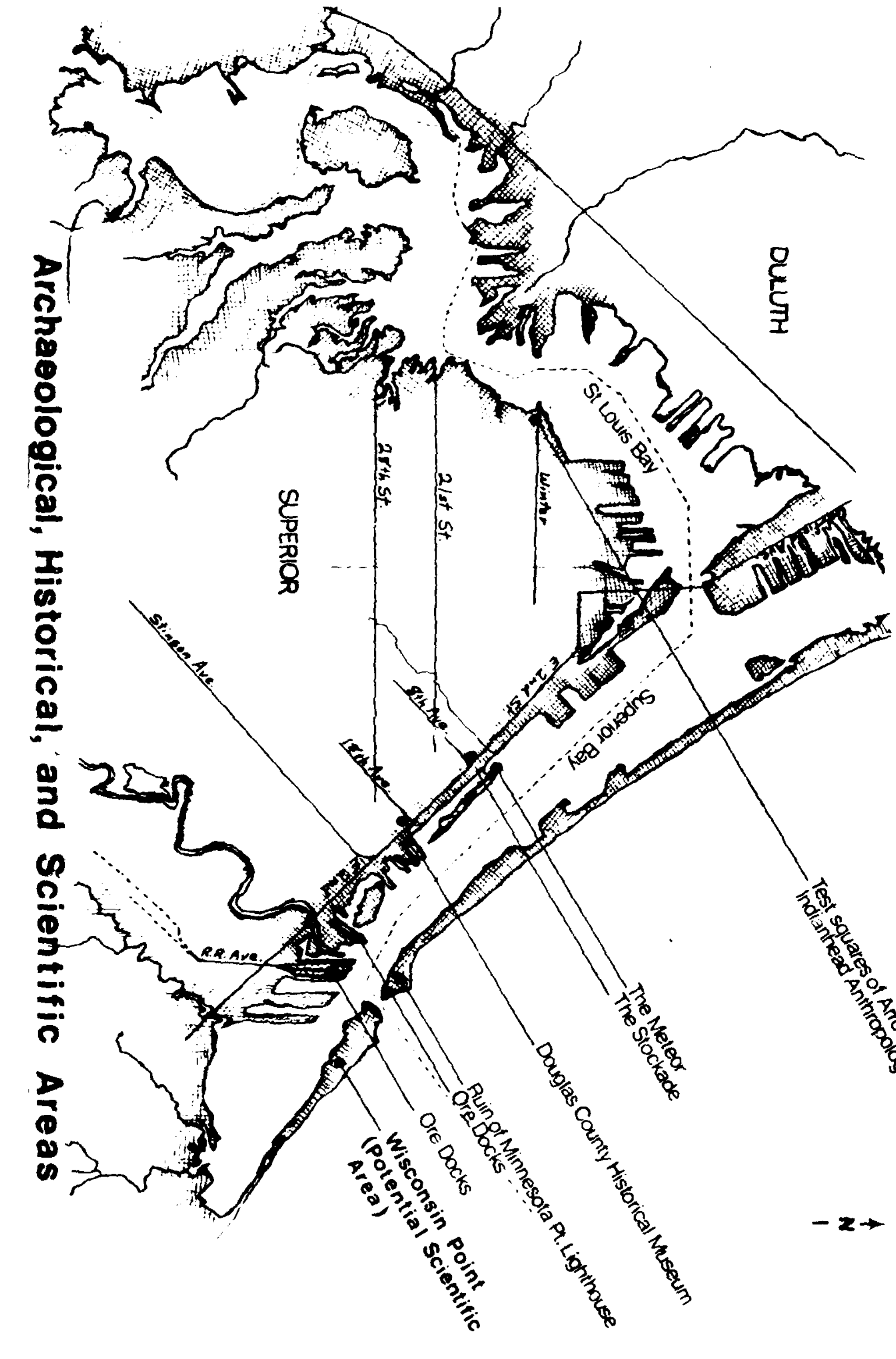

Archaeological, Historical, and Scientific Areas
DULUTH
SUPERIOR
St Louis Bay
Superior Bay
Winter
21st St
28th St
Stinson Ave
R.R. Ave
Test squares of Arrowhead
Indianhead Anthropological Society
The Meteor
The Stockade
Douglas County Historical Museum
Ruin of Minnesota Pt. Lighthouse
Ore Docks
Ore Docks
Wisconsin Point
(Potential Scientific
Area)
N

Exhibit 17

AD-A120 262 CORPS OF ENGINEERS ST PAUL MN ST PAUL DISTRICT F/G 15/5
BURLINGTON NORTHERN TACONITE TRANSSHIPMENT FACILITY, DULUTH-SUP--ETC(U)
MAR 75

UNCLASSIFIED NL

2 OF 2
AD A
20262

END
DATE
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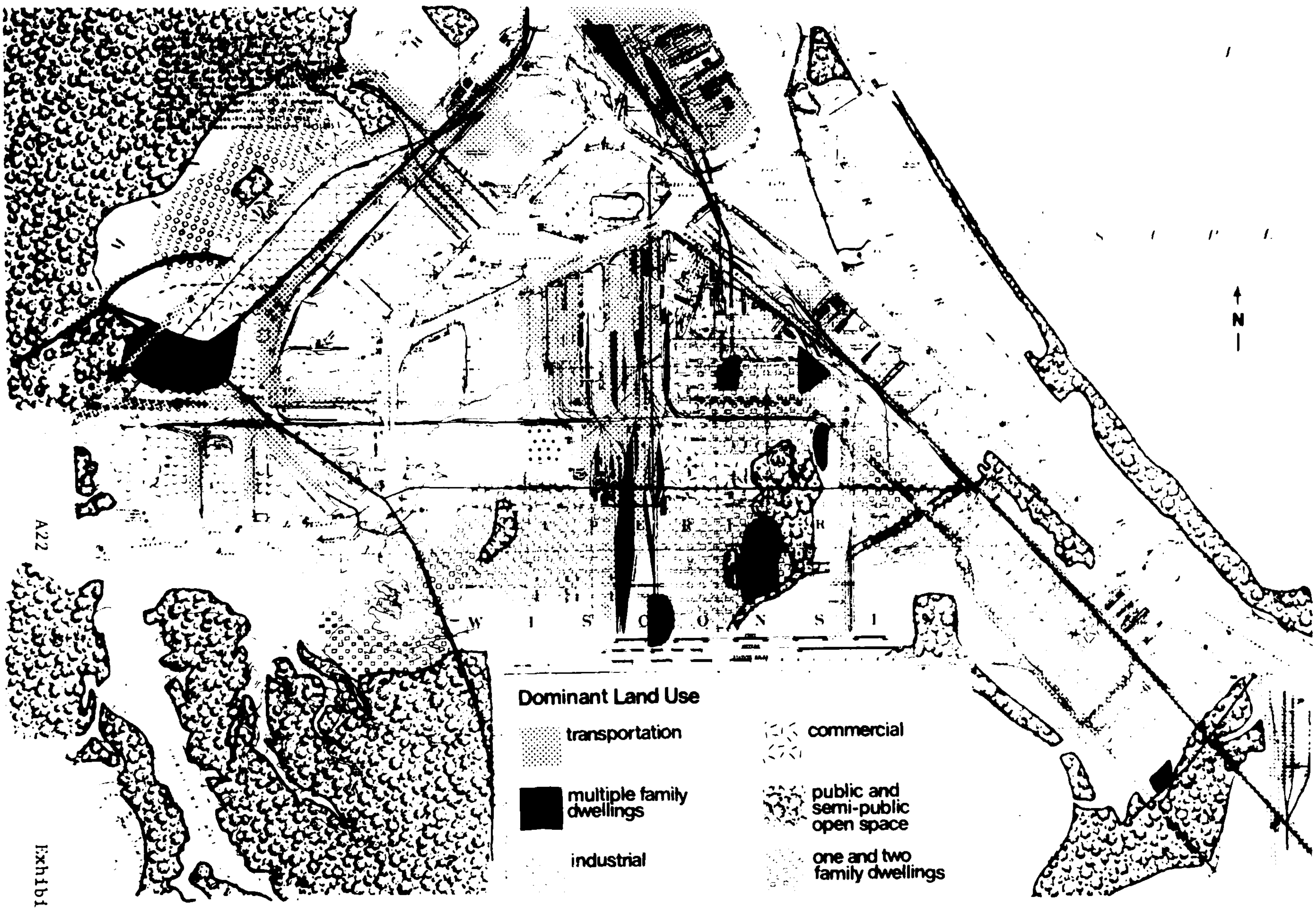
11-82
DTIC



Land Use-Regional

Exhibit 18

LAND USES - DULUTH AND SUPERIOR

		Residential	Commercial Retail	Commercial Services	Wholesale Trade	Manufacture	Transportation Terminal Storage Communication	Public Quasi Public Buildings	PQP Open Space	Vacant Land	Streets & Alleys
Superior 1965	Acres	1222.5	87.9	43.7	128.9	446.3	2012.1	172.0	6157.4	14153.3	1915.7
	% Total	4.6	.3	.2	.5	1.7	7.7	.7	23.4	53.6	7.3
Superior 1972	Acres	1315.3	100.2	50.1	133	447.4	2019.8	184.0	6154.5	13985.7	1949.8
	% Total	4.8	3.7	.2	.5	1.6	7.4	.7	22.6	51.3	7.2
Duluth 1965	Acres	4915.0	250.5	100.3	267.8	756.6	2086.2	650.4	9209.1	20344.1	4128.8
	% Total	11.5	.6	.2	.6	2	4.9	1.5	21.5	47.5	9.7
Duluth 1972	Acres	5140.4	309.5	110.6	269.9	754.5	2071.5	736.2	9139.1	19816.9	4360.2
	% Total	12.0	.7	.3	.6	1.8	4.9	1.7	21.4	46.4	10.2

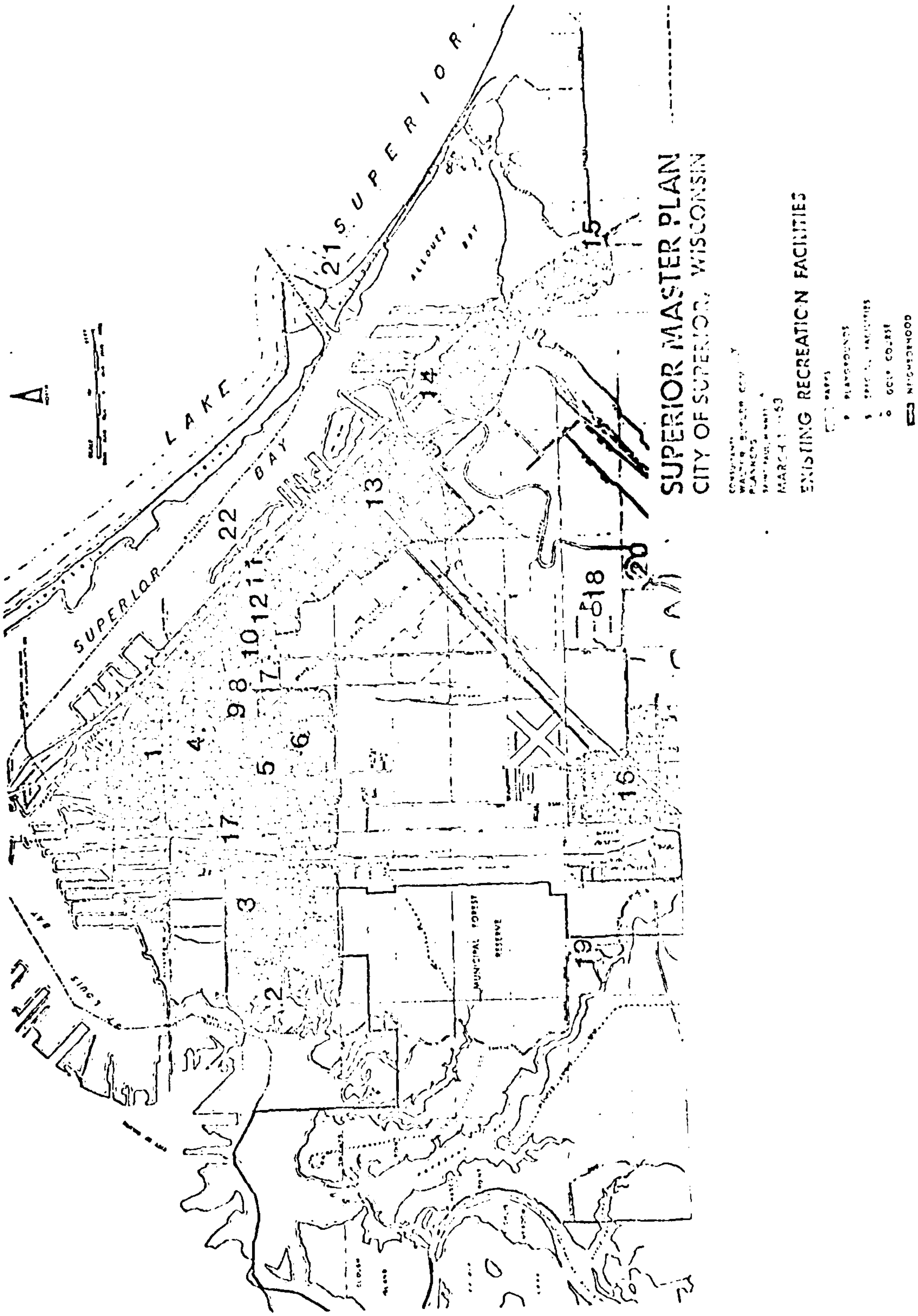

SUPERIOR MASTER PLAN
CITY OF SUPERIOR, WISCONSIN
EXISTING RECREATION FACILITIES
LAKE SUPERIOR
SUPERIOR BAY

Exhibit 19

EXISTING PUBLIC PARKS AND PLAYGROUNDS

Key No.	Name	Area in Acres	Facilities
NORTH END			
1	Kelley Park	2.40	Chiefly landscaped, with swings.
BILLINGS PARK			
2	Billings Park	56.00	Part landscaped, part naturalistic picnic sites, unused bathhouse, boathouse with social and club rooms, toilet facilities, small marina.
3	Cooper School Park Area	6.23	No landscaping, softball diamond, skating rink and permanent lighted hockey rink.
WEST END			
4	Wade Athletic Center	10.43	Football field, skating rink, lighted area for portable hockey rink.
5	Hammond Park	1.80	Entirely landscaped, with swings.
6	Pattison School Park & Playgrounds	6.27	No landscaping, little league softball and baseball diamonds, skating rink, permanent lighted hockey rink and shelter.
7	Speed Skating Rink	2.27	Used by speed skating club, lighted judges stand, shelter.
8	Recreation Area	8.45	Babe Ruth field, little league diamond.
9	Memorial Field	5.22	Football field to serve Wisconsin State College and Superior.
CENTRAL PARK			
10	Central Park	14.23	Chiefly landscaped, small lakes and lagoons, baseball diamond, small play area, skating on lagoon in winter.
11	Gouge Park	1.86	Entirely landscaped, with swings.
12	Redbarn Playground	2.10	Permanent lighted hockey rink, play area.
EAST END			
13	Washington Park	5.87	Chiefly landscaped, playground softball diamond, skating rink with shelter house.
ALLOUEZ			
14	Franklin School Park	4.70	Partially landscaped, playground with baseball diamond, skating rink with shelter house.
ITASCA			
15	Bear Creek Park	12.86	Partially undeveloped, baseball diamond, basketball courts club rooms.
SOUTH SUPERIOR			
16	Webster Park	2.40	Landscaped, sand and play area
CENTRAL BUSINESS DISTRICT			
17	Municipal Curling and Skating Rink	1.30	Indoor rink with artificial ice for curling and skating.
REMAINDER OF CITY			
18	Municipal Golf Course	161.64	City wide 18 hole golf course with golf club house and pro shop.
19	Pokegama Park	74.35	Undeveloped and in natural state with bird and wild flower sanctuary.
20	Winter Sports Area	122.00	Hill for tobogganing no shelter or warming house.
21	Wisconsin Point	202.00	Owned by city but not formally developed, left in natural state.
22	Barker's Island		Small public dock and boat landing and excursion boat dock, city owns small portion of NW tip of island.

Exhibit 20

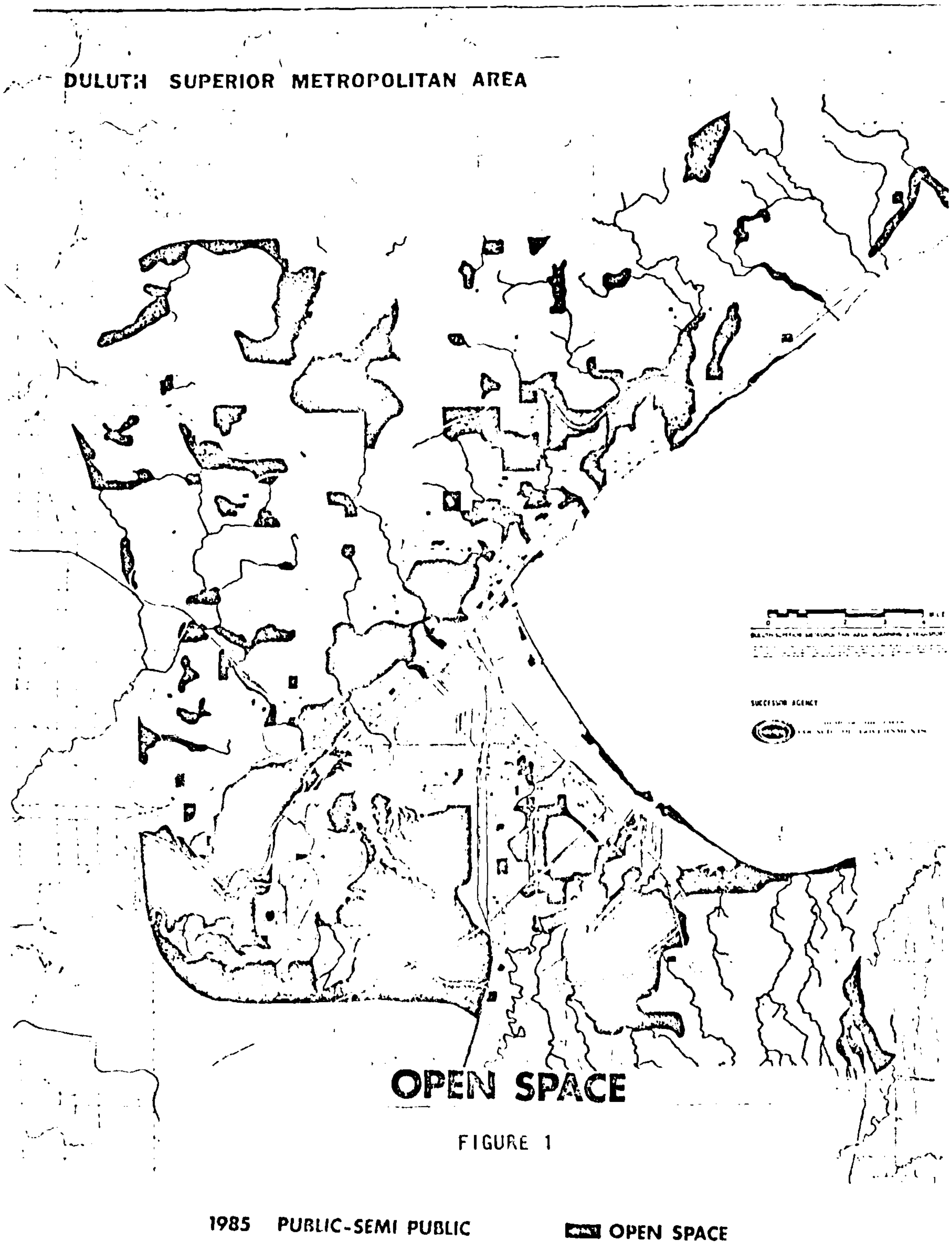

DULUTH SUPERIOR METROPOLITAN AREA
OPEN SPACE
FIGURE 1
1985 PUBLIC-SEMI PUBLIC
OPEN SPACE

Exhibit 21

Mammals Identified Through "Sign"

Common Name	Scientific Name
Masked Shrew	Sorex cinereus
Eastern Cottontail	Sylvilagus flouridanus
Norway Rat	Rattus norvegius
Weasel	Mustela spp.
Varying Hare	Lepus americanus
Striped Skunk	Mephitis mephitis

Exhibit 22

Birds Identified

Common Name	Scientific Name
Red Breasted Merganser	*Mergus serrator*
Ruffed Grouse	*Bonasa umbellus*
Ring-necked Pheasant	*Phasisnus colchicus*
Herring Gull	*Larus argentatus*
Ring Billed	*Larus delawarensis*
Domestic Pigeon - Rock Dove	*Columba livia*
Great Horned Owl	*Bubo virginianus*
Snowy Owl	*Nyctea scandiaca*
Downey Woodpecker	*Dendrocopos pubescens*
Hairy Woodpecker	*Dendrocopos villosus*
Purple Finch	*Carpodacus purpureus*
Blue Jay	*Cyanocita cristata*
Starling	*Sturaus vulgaris*
Common Crow	*Corvus bachyrhynchos*
Pine Grosbeak	*Pinicola enucleator*
Northern Shrike	*Lanius excubator*
Robin	*Turdus migratorius*
Black-Capped Chicadee	*Parus atracapillus*
Common Raven	*Corvus corax*
House Sparrow	*Passer domesticus*
Common Redpoll	*Acanthis linaria*
Snow Bunting	*Plectrophenax nivalis*

Exhibit 22

Location Quotient Analysis

In Location Quotient Analysis, exporting industries are termed basic industries and import industries non-basic. The basic industries in effect support the non-basic industries; the ratio of this support is determined in the following manner. A comparison is made between the local employment level for any given industry and the total employment level for the region, and the national employment for that same industry against total national employment. If the resultant ratio of these two coefficients is less than one, the industry would be termed non-basic. Should the ratio be greater than one the industry would be termed as being basic to the economy of the region. This Location Quotient Analysis can be used for an aggregate analysis to determine economic impact. Each basic industry requires other non-basic industries to meet the needs of the industry and its employees. Thus, for every set number of employees in the basic industry, a given number of employees in the non-basic industries will be required for supportive and service activities. The number of service employees can be determined through a type of multiplier analysis (Lichty and Jesswein, 1973).

"The familiar multiplier concept states, in brief, that an increase in the exports of a region will lead to an increase in regional employment and, therefore, to an increase in regional income. This increased income will, in turn, be spent and induce a second round of increased regional employment and income which will also be spent to induce more income, and so on, to a finite limit. The calculated regional multiplier is an estimate of that finite limet. It is an estimate of the total amount of income generated by an injection of one dollar of new income into the region." (Schenker, 1970). The multiplier analysis used for this study was the ratio of total employment in the region to the total employment in the basic industries.

Exhibit 23

Employment, Employment Coefficients and Location Quotient

For City of Superior-1970

Industry	EMPLOYMENT Superior	COEFFICIENT Local	COEFFICIENT U.S.	LOCATION Quotient
Agriculture, forestry fisheries	244	.01802	.03710	.48571
Mining	95	.00702	.00823	.85298
Construction	744	.05496	.05972	.92029
*Furniture, lumber & wood products	203	.01499	.01278	1.17293
*Primary metal	298	.02201	.01583	1.39040
Fabricated metal	95	.00702	.01911	.36735
Machinery, except elec.	176	.01315	.02600	.50577
Electrical machinery, equip. & supplies	54	.00399	.02488	.16037
*Food & kindred	271	.02002	.01816	1.10242
Textile mills & fabricated tex.	54	.00399	.02853	.13985
*Printing, publishing & allied	217	.01603	.01556	1.03021
Chemical & allied	14	.00103	.01290	.07984
Other manufacturing	623	.04602	.08534	.05393
*Railroad & railway express	1137	.08399	.00831	10.10710
Trucking & warehousing	162	.01197	.01414	.84653
*Other transportation	623	.04602	.01449	3.17598
Communications	149	.01101	.01402	.78531
*Utilities, sanitary serv.	271	.02002	.01677	1.19380
Wholesale trade	528	.03900	.04093	.95285
*Food & dairy stores	433	.03198	.02498	1.28022
*Eating & drinking estab.	758	.05599	.03003	1.86447
Other retail trade	1381	.10201	.10976	.92939
Finance, insurance, real estate	325	.02401	.03254	.73786
Business services	68	.00502	.01691	.29687
Repair services	189	.01396	.01436	.97214
Other personal services	379	.02800	.03148	.88945
Entertainment	68	.00502	.00824	.60922
*Hospitals and medical	1299	.09595	.05546	1.73008

Exhibit 23

(continued)

Industry	EMPLOYMENT Superior	COEFFICIENT Local	U.S.	LOCATION Quotient
*Education	1407	.10393	.08030	1.29427
*Non-profit and region	244	.01802	.01519	1.18631
Professional	203	.01499	.02552	.58738
Government	704	.05200	.05488	.94752
Private households	122	.00901	.01470	.61293
TOTAL EMPLOYMENT	13,538			
TOTAL BASIC EMPLOYMENT	7,161			

Superior Multiplier - 1.90

*Indicates Basic Industries

Source: Lichty and Jesswein, 1973

Exhibit 23

SHAKER TESTS

Test Procedures

Taconite samples from the Butler and National Mines were subjected to acidic, neutral, and basic solutions. The purpose of the tests was to determine the amounts of heavy metals present after shaking.

Methods. Shaking procedures involved the following:

1. Samples were dried to a constant weight at 105°
2. Twenty grams of the sample were placed in 1000 ml of water. The pH was them adjusted to the desired level.
3. The mixture was then transferred to a shaker table, which set at maximum speed, for 30 minutes.
4. The pH was recorded after shaking.
5. Water samples were than analyzed.

Chemical Analysis Prcedures

The procedures used to analyze the water from the shaker tests are outlined in Table. Detection limits are also presented.

Detection Limits

Parameter	Detection Limit mg/I	Reference
Arsenic	0.001	Perkin-Elmer
Barium	0.05	Perkin_Elmer
Cadmium	0.0001	Perkin-Elmer
Chromium	0.005	Perkin-Elmer
Cobalt	0.005	Perkin-Elmer
Copper	0.005	Perkin-Elmer
Lead	0.001	Perkin-Elmer
Manganese	0.005	Perkin-Elmer
Mercury	0.0002	EPA, p. 121
Molybdenum	0.05	Perkin-Elmer
Nickel	0.005	Perkin-Elmer
Selenium	0.001	Perkin-Elmer
Strontium	0.05	Perkin-Elmer
Vanadium	0.05	Perkin-Elmer
Zinc	0.005	Perkin-Elmer

Exhibit 24

Results

The results of the shaker analysis will be discussed by sample. All chemical analyses are presented.

National Mine -- Taconite

Sample 1

Initial pH 4.2

Final pH 5.3

Findings: Sample 104 had the most detectable metals: Lead 0.001 mg/l zine, 0.20 mg/l; copper, 0.005 mg/l and cadmium, 0.0003 mg/l. All other parameters were below the level of detection. There was a rise of 1.1 pH during the shaking.

Sample 2

Initial pH 7.3

Final pH 7.2

Findings: zinc and cadmium were found in low concentrations: 0.015 mg/l and 0.0004 mg/l, respectively. All other parameters were below the level of detection. There was a drop of 0.1 pH unit during shaking.

Exhibit 24

Shaker Analysis of Taconite
in Solution at Various pH
(amounts in mg/l)

Parameter	(pH)	Sample* 1 4	2 7
Vanadium		<0.05	0.05
Lead		<0.001	0.001
Zinc		0.20	0.015
Copper		<0.005	0.004
Cadmium		0.0003	0.0004
Barium		<0.05	0.05
Molybdenum		<0.05	0.05
Chromium		<0.005	0.005
Manganese		<0.005	0.005
Nickel		<0.005	0.005
Cobalt		<0.005	0.005
Arsenic		<0.001	0.001
Selenium		<0.001	0.001
Strontium		<0.05	0.05
Mercury		<0.0002	0.0002
Iron, Total			240
			560**
Iron, Total filtered			3.9
			3.1**

*Source of taconite pellets: National Mine

**Source of Taconite Pellets: Butlermine

Exhibit 24

Column-Leaching Analysis

The composition of the leachate is significant in determining its potential effects on the quality of nearby surface water and groundwater. Contaminants carried in leachate are dependent on the composition of the taconite ore pellets and also on simultaneously occurring physical and chemical activities within the stockpile.

To model the stockpile conditions a cylindrical column (interior diameter of 4.0 inches) was packed with taconite ore pellets in six-inch layers, ten tamps per layer, yielding a total packed depth of 2.3 feet. A small air pump was connected to the bottom of the test column and air was slowly pumped into the bottom of the column. A 500 ml quantity of distilled water was then poured into the column and allowed to percolate into a collection flask below. This leachate was then measured on a daily basis and pH values determined. After these data were obtained, the leachate was poured over the column and allowed to re-percolate. In addition, an amount of distilled water was then poured onto the column to make up the difference from the original 500 ml quantity. The results after fifteen days of performing the above steps on taconite pellets from National Mines are depicted in Figure

Taconite Leaching Column Data

Date	Volume (ml)	pH
1 April 74	500	8.5
2 April 74	150	7.8
Recycled	150 + 350	8.1
3 April 74	300	8.1
Recycled	300 + 200	8.0
4 April 74	450	8.5
Recycled	450 + 50	8.4
5 April 74	475	8.2
Recycled	475 + 25	8.3
8 April 74	450	8.3
Recycled	450 + 50	8.7
10 April 74	450	8.3
Recycled	450 + 50	8.4
11 April 74	475	8.7
Recycled	475 + 25	8.7
15 April 74	450	8.7
Recycled	450 + 50	8.8

Exhibit 24

Table [redacted] presents a chemical analysis of leachate resulting from 25 days of recirculation of distilled water through the leaching column when packed with national taconite. The purpose of this testing and analysis is to assure that metals and other elements are not going to be present in the leachate collected from the taconite facility which will have an adverse effect on the receiving streams water quality.

Table

Taconite (National) Column Leachate, 25 days, 5-30-74

Chloride	15	mg/l
Kjeldahl Nitrogen	0.83	mg/l
Nitrate (as nitrogen)	0.40	mg/l
Total Phosphorus	1.97	mg/l
Arsenic, Total	800	ug/l
Barium, Total	<0.02	mg/l
Cadmium, Total	0.007	mg/l
Calcium, Total	36.5	mg/l
Chromium, Total	0.03	mg/l
Cobalt, Total	0.02	mg/l
Copper, Total	0.02	mg/l
Iron, Total	180	mg/l
Lead, Total	0.04	mg/l
Manganese, Total	0.02	mg/l
Mercury, Total	0.2	ug/l
Molybdenum, Total	<0.01	mg/l
Nickel, Total	0.03	mg/l
Selenium, Total	<1	ug/l
Sodium, Total	66.6	mg/l
Strontium, Total	0.19	mg/l
Vanadium, Total	0.14	mg/l
Zinc, Total	0.055	mg/l

Exhibit 24

Introduction

Benthos (Macroinvertebrates) are important members of the aquatic food web. The taxonomic groups which are most common in freshwater are insects, annelids, molluscs, flatworms, roundworms, and crustaceans. The species present, their distribution, and the abundance of benthos are subject to natural seasonal fluctuations. Freshwater aquatic insects have a series of life stages, not all of which are aquatic, hence they are not always present. Almost any substrate can provide suitable habitat for benthic organisms although the substrate is often the determining factor as to the type of benthic organism which will be found (Tebo et al. 1973).

Tebo et al. (1973) stated that the benthic community is very sensitive to stress, and that it is a useful indicator in the detection of environmental perturbation. Because of their relatively long life cycles, the species of benthos found and their relative numbers reflect the conditions of the recent past.

One method which has been used to determine stress in benthic communities is species diversity analysis. Tebo et al. (1973) stated that species diversity is comprised of two components, the richness of the species and the distribution of individuals among the species. Mean species diversity $\bar{d}$ which takes into account both components mentioned above will range between zero (0) and log N, where N is the total number of organisms found.

In an environment where there is a discharge, the community may be disturbed resulting in fewer different species of organisms with larger numbers of a particular species tolerant to the discharge characteristics. Such disturbances usually result in lower species diversity levels than in undisturbed communities.

Methods

The benthic community was sampled at five stations in the Duluth-Superior Harbor on February 12 and 13, 1974.
All organisms were collected using either a 9 inch Ponar or a tall form 6 inch Ekman grab.

All samples were placed in plastic jars, preserved with 10 percent formalin, transported to the laboratory, and refrigerated. Within three days the samples were hand washed in a U.S. Standard No. 30 sieve (0.565 mm) to remove a major portion of the substrate. The residue was placed in a shallow white enamel pan and the organisms were removed with the aid of a Dazor magnifying lamp. Due to the large size of many of the samples, subsamples were made using the Folsom Splitter.

The great abundance of segmented worms (Oligocheata) required the following subsampling procedure:

Sample	Subsample
1-50 individuals	all
50 + individuals	50 individuals

No other group of organisms were subsampled.

Oligocheates were cleared in Amman's lactophenol for several days before being mounted in Turtox CMC for identification. Midge larvae were also mounted in CMC on permanent slides. The remaining benthic organisms were stored in vials containing 70 percent ethyl alcohol and 5 percent glycerin.

Identification of the organisms was as specific as the age and physical condition allowed.

Results and Discussion

A few important considerations should be understood when reviewing the results of this study. The winter season is not the most favorable time of the year to determine the optimum species density and diversity. Population numbers are generally at a low point in these life cycles. Oligochaetes reproduce and mature during the warmer months, thus peak populations are usually present in late summer and early fall. Chironomid reproduction is usually synchronized with temperature. Most midge species emerge and mate during late spring and early summer. Peak benthic populations are usually present in late summer.

The macrobenthic organisms have often been used as indicator-organisms to infer the present state of, or change in, the aquatic environment. The change in benthic organisms can occur over a long or short period of time, and the effect can be wide reaching or localized.

The premises of this classification are based on:

1) Most benthic organisms are very sedentary during a major portion of their complete life cycle.

2) Most benthic organisms complete their life cycle in 12 or more months; thus, an interruption, cessation, or acceleration of that cycle suggests a response to a change in their environment.

3) Knowing that benthic organisms are sedentary, their absence, presence, increase, or decline from a previously determined population level can denote a change in their environment.

Based on similar premises, the U.S. Environmental Protection Agency (1973) has developed a tolerance classification for benthic organisms for the United States.

. Caution must be exercised when using organisms as trophic indicators because anomalies resulting from local environmental conditions or other factors may occur.

Many benthic studies have been conducted on Great Lakes harbors and embayments. Most have been shown to possess an assemblage of organisms similar to that found in this investigation. The dominant groups are almost always oligocheate worms, midge larvae and sphaeriid clams. The presence and distribution of the organisms is determined by many factors, especially substrate type and food availability.

The south harbor stations exhibited a variety of substrate types. Most were silty sands and clays. The fauna of the south harbor stations yeilded more mollusks, caddis larvae and isopods

Species diversity was calculated for the benthic organisms from each station. Diversity in general was quite low in both the north and south harbor areas. In the harbor area, Station 13 had the highest diversity. Station 16, in the open lake, had the lowest diversity.

Results by station:

South Harbor

Station 10 Approximately 50 ft. away from taconite dock
Sandy silt with coarse organic debris
Depth - 23 ft. Ekman grab
D. I. 0.8450 (3)

Only three species of oligocheates were collected here but this station produced the highest number of cocoons. It also yielded a relatively large number of Peloscolex multisetosus. According to Hiltunen (1967), the two subspecies of this worm are present in open lake areas, but thrive in bays and harbors which receive excessive nutriment.

Station 11 Between taconite dock piers
Sandy silt with coarse organic debris
Depth - 23 ft. Ekman grab
D. I. 0.6178 (6)

Asellus racovitzai racovitzai was present in large numbers, at densities more than 12 times that of the second most abundant station. This organism is a scavenger and feeds on dead animals and organic matter.

This station also yielded the highest numbers of Peloscolex multisetosus multisetosus and the second highest numbers of the caddisfly Phylocentropus sp. It produced more oligocheates than any of the south harbor stations.

Station 13 North central Allouez Bay
Silt with large amounts of fine organic detritis
Depth - 6 ft. Ekman grab
D. I. 0.9115 (1)

Exhibit 25

Diversity index is deceiving at this station. It yielded the second lowest number of worms. Consequently, Procladius numbers were reduced and larvae of the tolerant Chironomus dominated the midge fauna.

During sample preparation and observation, twice-washed samples from this station deposited star-like oil stains on laboratory apparatus.

Station 14 Southwest Allouez Bay
Silt
Depth - 6 ft. Ekman grab
D. I. 0.8478 (2)

This station yielded the greatest numbers of the mollusks Amnicola sp., Sphaerium corneum and Sphaerium rhomboideum, and the caddis larva Phylocentropus sp.

Station 16 Open Lake Superior
Fine sand, silt, pebbles
Depth - 17 ft. Ponar grab
D. I. 0.4392 (10)

Only three organisms were collected from this station, Asellus and two chironomids not found at any other station. Diversity is low because the sample was taken from the physically harsh inshore area of an oligotrophic lake where few animals are able to establish themselves.

Exhibit 25

Duluth-Superior Benthos
(Mean Density/sq m)

Benthic Organism	Station Number 10	11	13	14	16
Annelida					
Oligocheata					
Aulodrilus americanus	-	-	57	-	-
Aulodrilus pluriseta	-	-	115	29	-
Limnodrilus hoffmeisteri	57	29	-	-	-
Peloscolex multisetosus longidentus	459	86	-	-	-
Peloscolex multisetosus multisetosus	373	1608	-	574	-
immature *Lumbriculidae*	-	-	-	115	-
undetermined immature forms with capilliform chaetae	29	-	-	-	-
undetermined immature forms without capilliform chaetae	603	1411	689	890	-
Oligocheata coccoons	344	-	-	57	-
Polycheata					
Manayunkia speriosa	-	-	57	-	-
Hirudinea					
Helobdella stagnalis	-	-	57	-	-
Arthropoda					
Crustacea					
Isopoda					
Asellus racovitzei racovitzai	115	4535	345	86	6
Insecta					
Ephemeroptera					
Trichoptera					
Phylocentropus sp.	-	143	-	172	-

Exhibit 25

Table continued)

Benthic Organism	Station Number 10	11	13	14	16
Diptera					
Chironomidae					
Chironomus sp.	-	29	460	-	-
Clinotanypus sp.	-	-	-	-	-
Cryptochironomus sp.	29	-	57	-	-
Monodiamesa sp.	-	-	-	-	19
Procladius sp.	459	258	230	115	-
Stictochironomus sp.	-	-	-	-	13
Tribelos sp.	-	-	57	-	-
Mollusca					
Gastropoda					
Amnicola sp.	-	-	115	1120	-
Physa sp.	-	29	-	-	-
Valvata sincera	29	115	-	-	-
Pelecvpoda					
Sphaeriidae					
Pisidium sp.	-	-	-	-	-
Sphaerium corneum	29	402	172	775	-
Sphaerium rhomboideum	-	-	-	1033	-
Diversity	0.8450	0.6178	0.9115	0.8978	0.4392

COST COMPARISON--ALL RAIL VS. PROPOSED PROJECT

Equipment Requirements

Equipment	Transshipment Facility	All rail shipment
Cars	855	3417
Locomotives	18	74
Cabooses	5	18

The comparative costs between the transshipment facility and an all rail alternative based on above equipment requirements is as follows:

Comparative Costs

Item	Transshipment Facility	All rail shipment
Facility Costs (Superior)	$40,000	- -
Rail Cars	21,375,000	$85,425,000
Locomotives	6,606,000	27,158,000
Cabooses	205,000	738,000
Total Costs	$68,186,000	$113,321,000

The above costs are based on 1974 delivery costs. Costs for additional crews and fuel required for all rail shipment are not included in above costs. The above costs do not include costs of modifications at the steel mills to handle all rail shipments of taconite pellets.

A comparative delivery cost for movement of taconite pellets to Burns Harbor is $5.62 per ton for a rail-water shipment with a transfer at Superior and $7.11 per long ton for an all rail shipment.

Exhibit 26

Exhibit 27

Drainage Basin Statistics for Ashland and Bayfield Counties[1]

Stream	Length	(ft/mi.) Average Gradient	ft^3/sec 1973 Mean Discharge	sq. mi. Drainage Area
Iron R.	26.3	19.2	191.7	142.2
Flag R.	13.3	29.9	43.3	49.3
Cranberry R.	14.6	34.8	41.1	63.4
Siskiwit R.	10.2	45.0	62.5	25.5
Sand R.	17.9	25.0	11.3	40.3
Rasberry R.	9.6	60.2	5.5	17.1
Pikes Creek	11.9	39.6	18.9	32.9
Onion R.	3.6	132.0	9.4	5.9
Sioux R.	15.1	44.9	58.1	83.7
Boyd Creek	4.5	109.0	1.7	4.8
Wittlesey Creek	5.8	75.0	24.0	25.4
Fish Creek	21.0	25.6	103.3	146.6
Bad River System	62.5	14.8	558.3	1092.0
White River	27.0	18.5	240.1	392.3
Marengo R.	39.9	18.3	129.6	151.6
Brunsweiler R.	25.7	29.0	-	87.7

[1]Source: Dickas, A. B. (ed.), 1973: Wisconsin's Lake Superior Basin Water Quality Study.

Employment/Unemployment Statistics

STATE OF WISCONSIN

	1970	1971	1972	1973	October 1974
Civilian Labor Force	1,824,000	1,852,000	1,908,000	2,063,000	2,173,000
Number Employed	1,752,000	1,768,000	1,827,000	1,979,000	2,089,600
Number Unemployed	72,000	84,000	81,000	84,000	83,400
Unemployment Rate	3.9%	4.5%	4.2%	4.1%	3.8%

Source: State of Wisconsin Dept. of Industry Labor & Human Relations, Employment Security Division, 1974

WASHBURN CITY

	1970	1971	1972	1973	October 1974*
Civilian Labor Force	840	660	640	680	700
Number Employed	820	630	620	660	680
Number Unemployed	20	30	20	20	10
Unemployment Rate	2.7%	4.7%	3.3%	2.9%	1.7%

Source: State of Wisconsin, Dept. of Industry, Labor & Human Relations, Employment Security Division, 1974

Exhibit 28

ASHLAND CITY

	1970	1971	1972	1973	October 1974
Civilian Labor Force	4030	3640	3820	3750	3800
Number Employed	3840	3380	3580	3500	3580
Number Unemployed	190	260	240	240	220
Unemployment Rate	4.8	7.1	6.2	6.5	5.9

Source: State of Wisconsin, Dept. of Industry, Labor & Human Relations Employment Security Division, 1974

NOTE: Totals may not agree due to independent rounding. Figures represent yearly averages except for 1974. Tables are not seasonally adjusted. Calculations are based on Census Shared Method

BAD RIVER INDIAN RESERVATION

	MARCH 1971	MARCH 1972	MARCH 1973
Civilian Labor Force	130	130	170
Number Employed	100	100	150
Number Unemployed	30	30	20
Unemployment Rate	23.4	23.5	10.8

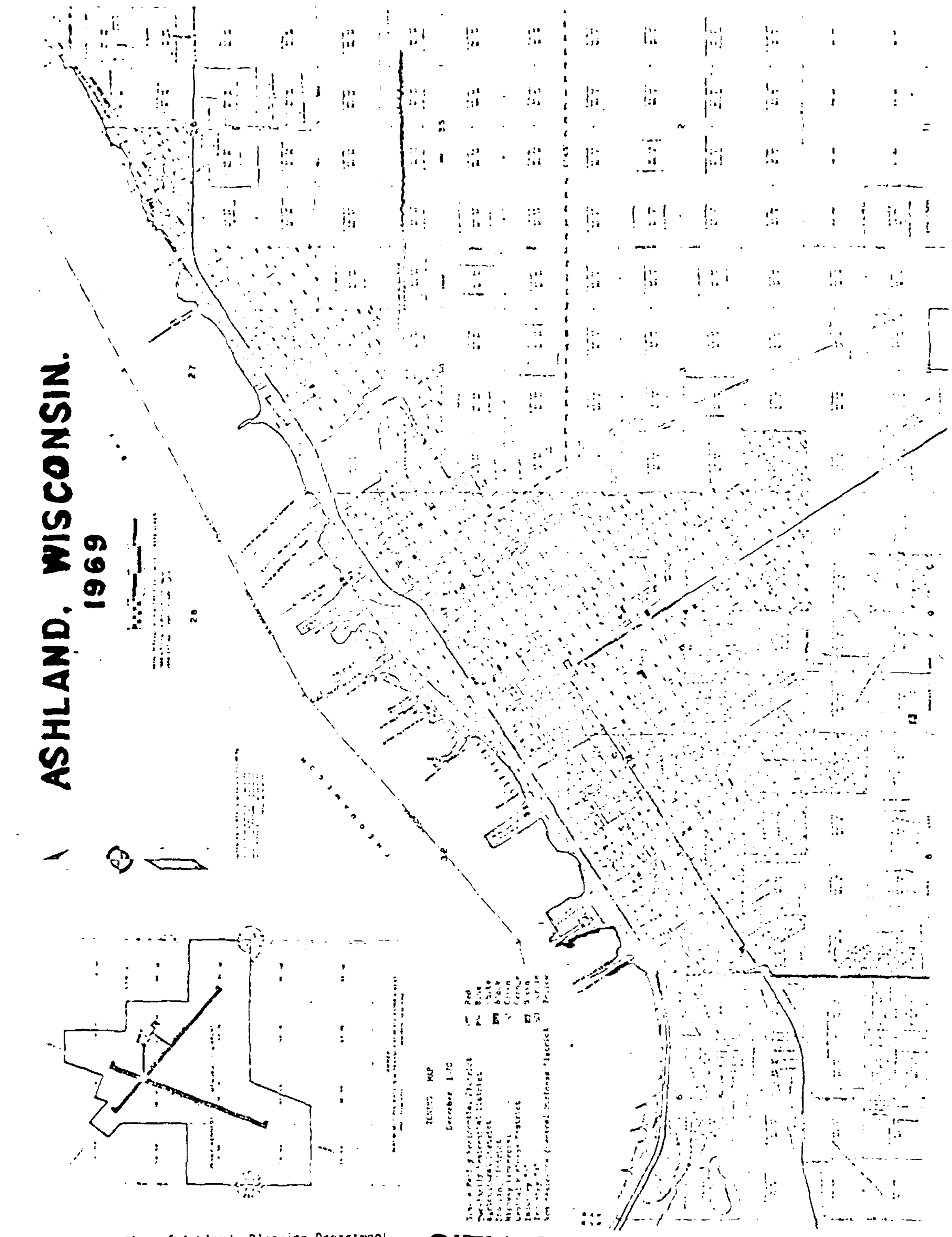
Source: U.S. Dept. of Interior, Bureau of Indian Affairs, Great Lakes Agency, Ashland, Wisconsin.

RED CLIFF INDIAN RESERVATION

	MARCH 1971	MARCH 1972	MARCH 1973
Civilian Labor Force	70	80	90
Number Employed	40	60	70
Number Unemployed	30	20	20
Unemployment Rate	40	21.9	24

Source: U.S. Dept. of Interior - Bureau of Indian Affairs, Great Lakes Ashland, Wisconsin

Exhibit 28



Source: City of Ashland, Planning Department

CITY OF ASHLAND - ZONING

Exhibit 29

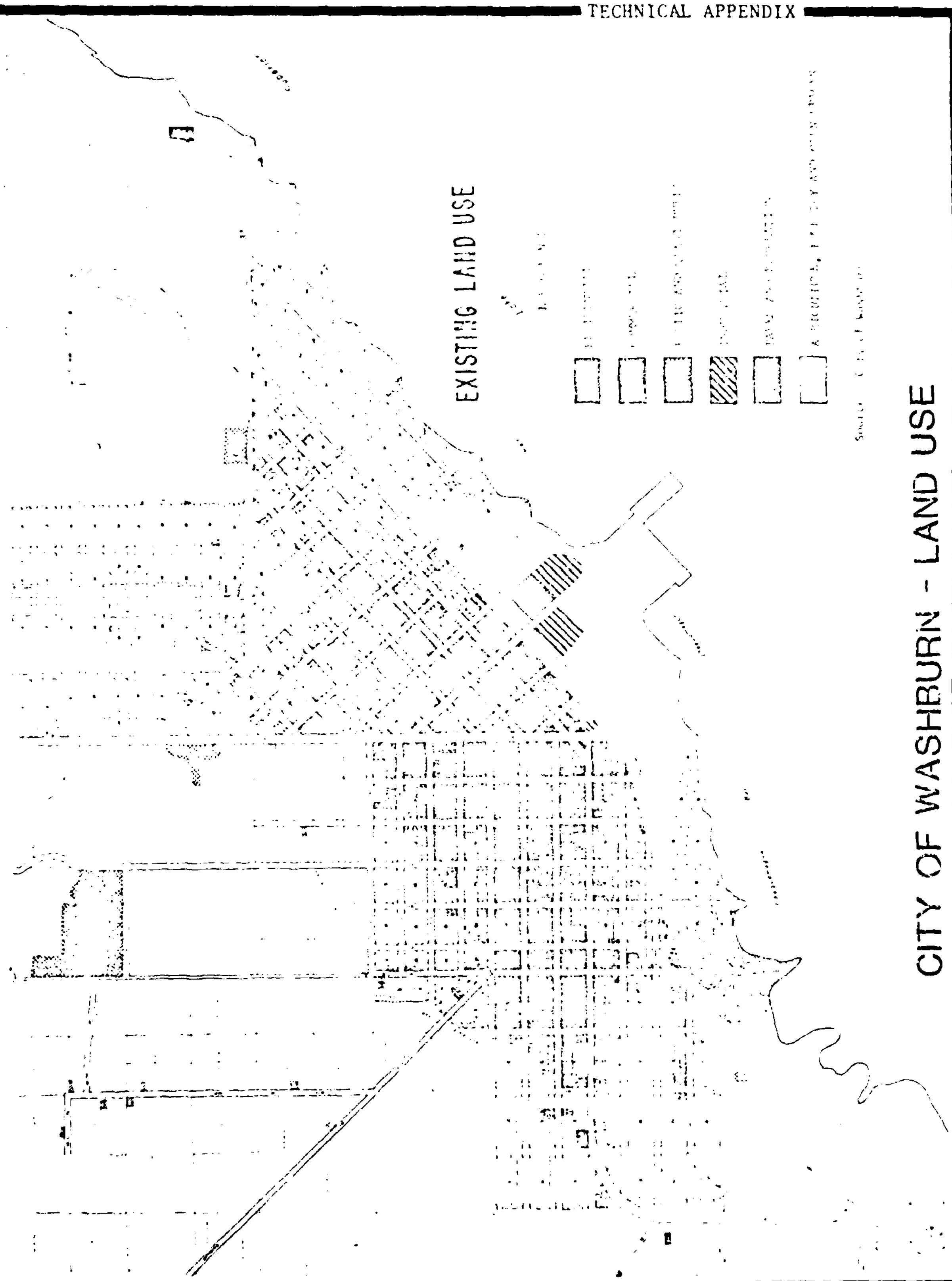


Exhibit 30

Copy

NCSED-ER

19 December 1974

Dr. David J. Arndorfer
Senior Planner
Roy F. Weston, Inc.
3201 Old Glenview Road
Wilmette, Illinois 60091

Dear Dr. Arndorfer:

Reference is made to your letter dated 7 October 1974 and the Wisconsin State Historical Society letter dated 24 September 1974 regarding the need for an archeological investigation of the project area at the proposed Taconite Transshipment Facility, Superior, Wisconsin, (Permit Number LS174). We concur with the recommendations of the Historical Society and request that you initiate the investigation as soon as possible.

If we can be of further assistance, please contact this office.

Sincerely yours,

ROGER G. FAST
Chief, Engineering Division

Copy furnished:
Mr. Donald V. Sartore
Chief Engineer, Design
Burlington Northern Inc.
176 East 5th Street
St. Paul, Minnesota 55101

THE STATE HISTORICAL
SOCIETY OF WISCONSIN
816 STATE STREET / MADISON, WISCONSIN 53706 / JAMES MORTON SMITH, DIRECTOR

State Historic Preservation Office

September 24, 1974

Dr. David J. Arndorfer
Roy F. Weston, Inc.
3201 Old Glenview Road
Wilmette, Illinois 60091

SHSW 1030-74

Dear Dr. Arndorfer:

Reference September 10, 1974 letter and the enclosed two-volume Environmental Impact Report for the Taconite Transshipment Facility, Superior, Wisconsin.

We would like to emphasize our position as outlined in our August 10 letter to you, which is included in the appendices of the cited report (page B-4). Therein we noted that the impact on possible unrecorded archeological sites caused by construction to be associated with this project cannot be assessed until "a survey is done by a professional archeologist."

Our major concern is the area in which spoil is to be deposited.

Unfortunately, we do not find a reference to the necessity for such a survey. Such a survey should be made prior to any further planning. The Wisconsin State Archeologist, Dr. Joan Freeman, who is a member of our staff, is prepared to advise and assist.

Sincerely,

James Morton Smith

James Morton Smith
State Historic Preservation Officer

JMS:omc
cc: Mr. James E. Lundsted, Director
Douglas County Historical Society

Effect of Dust Suppression Controls on Air Quality in Allouez
($\mu g/m^3$ above background)

	Air Quality				
	Existing	1977	Improvement	1980	Improvement
Ambient Sampling Site					
Geometric Mean	30	8	22	10	20
Maximum 24-hour	150	48	102	61	89
Maximum in Allouez					
Geometric Mean	50	15	35	20	30
Maximum 24-hour	300	86	214	111	189

National Ambient Air Quality Standards

	Primary Standard	Secondary Standard
Annual Geometric Mean	75 micrograms/m^3	60 micrograms/m^3
Maximum 24 hour average (not to be exceeded more than once per year	260 micrograms/m^3	150 micrograms/m^3

EXHIBIT 33